LEAN TRANSFORMATION IN AN OFFICE ENVIRONMENT

Lean tools and engagement techniques for office managers

HAMK
HÄMEEN AMMATTIKORKEAKOULU
HÄME UNIVERSITY OF APPLIED SCIENCES

Master's thesis

Master's Degree in International Business and Entrepreneurship

Visamäki, autumn 2016

Linda Riihimäki

HAMK
HÄMEEN AMMATTIKORKEAKOULU
HÄME UNIVERSITY OF APPLIED SCIENCES

VISAMÄKI
Degree Programme in Business Management and Entrepreneurship

Author Linda Riihimäki **Year** 2016

Title of Master's thesis Lean Transformation in an office environment

ABSTRACT

Lean transformation has started in Metso Minerals Tampere factory. Lean management was seen as a method to improve the factory's productivity after Metso's new strategy with challenging financial targets was released. The factory is a hundred years old with old habits, beliefs and a rather hierarchical management approach. Lean transformation is a large cultural change that would require both managers and employees to commit to lean transformation and change their behaviours.

The aim of the study was first to evaluate the lean tools already used in the factory and find out if those tools were the most suitable for the office environment. The second goal was to observe employees' motivation and engagement required in any large organisational change. The study aimed to find concrete leadership techniques that would motivate and engage employees to adopt lean culture.

Action research and constructive research approaches were used to find answers for these research questions. The research methods in this study were qualitative participation observation method and open informal discussion. The empirical research done in the workplace was mainly done in the office of logistics professionals and participating in management board's meetings together with all operational managers of the factory.

This research includes a theoretical study of lean principles, particularly from the perspective of office environment, change management and motivation and engagement theories.

The research provides all leaders with basic knowledge of the above topics. The results suggest implementing some new lean tools and maximizing the benefits of the tools the office team is already using. It also suggests that managers should focus on motivating and engaging their employees before implemeting specific lean tools. The research offers suggestions on how to build motivation and engagement in the team.

Keywords Lean management, lean transformation, people leadership, motivation and engagement

Pages 76 p.

HAMK
HÄMEEN AMMATTIKORKEAKOULU
HÄME UNIVERSITY OF APPLIED SCIENCES

TIIVISTELMÄ

VISAMÄKI
Degree Programme in Business Management and Entrepreneurship

Tekijä Linda Riihimäki **Vuosi** 2016

Työn nimi Lean muutos toimistotyössä

TIIVISTELMÄ

Metso Minerals Tampereen tehtaan on parannettava tuottavuuttaan ja tehokkuuttaan Metson uuden strategian ja tiukentuneiden taloudellisten tavoitteiden mukaisesti. Tampereen tehtaan johto halusi parantaa tuottavuutta lean filosofian menetelmin. Satavuotiaalla tehtaalla on vahvat perinteet ja vakiintuneet toimintamallit. Lean muutos on valtava organisaation muutos ja edellyttää sitoutumista leaniin niin johdolta kuin jokaiselta työntekijältäkin.

Tutkimuksen tavoitteena oli analysoida tehtaan jo käyttöönottamia lean-työkaluja sekä arvioida kuinka ne sopivat toimistoympäristöön. Toisena tavoitteena tutkimuksessa oli tarkkailla työntekijöiden motivaatiota sekä sitoutumista, koska ne ovat avaintekijöitä minkä tahansa suuren organisaatiomuutoksen läpiviennissä. Tutkimuksen tarkoituksena oli löytää konkreettisia toiminta-askelia, joilla johtajat voivat motivoida ja sitouttaa työntekijöitä lean muutokseen.

Tämä on kehittämispainotteinen toiminnallinen opinnäytetyö, jonka menetelminä käytettiin osallistuvaa havainnointia sekä avointa epämuodollista keskustelua. Empiirinen tutkimus tehtiin tehtaalla logistiikkatiimissä toimistotyöympäristössä sekä osallistumalla yhdessä muiden operatiivisten johtajien kanssa tehtaan johtoryhmän kokouksiin.

Teoreettinen tutkimus sisältää teorioita lean johtamisesta, jossa erityispainopiste on lean toimistoissa, muutosjohtamisesta sekä työntekijöiden motivoinnista ja sitouttamisesta.

Tutkimuksen tuloksena esitetään konkreettisia ehdotuksia uusien lean-työkalujen käyttöönotosta sekä parannusehdotuksia jo käytettyihin työkaluihin. Voidaan myös todeta, että johtajien tulisi keskittyä ennen lean-työkalujen käyttöönottoa ihmisten motivoitiin ja sitouttamiseen. Tutkimuksen tuloksena esitetään myös ehdotuksia tutkimuskohteena olevan tiimin ihmisten motivoinniksi ja sitouttamiseksi.

Avainsanat Lean johtaminen, lean muutos, ihmisten johtaminen, motivointi ja sitouttaminen

Sivut 76 s.

CONTENTS

1 INTRODUCTION

1.1 Research topics and introduction to the thesis

This study is a final thesis for Master's degree in Business Administration and Entrepreneurship. It addresses three main topics from practical and theoretical point of view. These topics are lean management, lean in an office environment and change management including motivating and engaging people. These topics come together in lean transformation, which is a term for changing organisational culture towards lean management.

The first topic is lean management. Lean management is a leadership method that origins from the Japanese management methods, especially Toyota car manufacturing (Liker 2003, 7). Nowadays many western manufacturing companies are adopting lean principles to improve the organisation's efficiency. Lean management is really an organisation wide philosophy that aims at continuous improvement in all processes and by everyone (Imai, 1986). This philosophy puts customer value first and aims to eliminate all company processes that do not bring value to the customer (Womack and Jones 1996, 10). Lean philosophy will change the entire organisational culture (Liker 2003, 7). It is sometimes criticized for focusing too much on tools while not giving management the answers for motivating and engaging their employees to accept this organisational change (Markovitz, 2007). Liker (2003, 299) wrote that changing the organisation's culture comes from day-to-day work using lean tools and living the lean culture. So implementing the right lean tools and getting positive results from the tools will eventually win employees over no matter how resistant they were in the beginning.

The study provides the reader with basic principles of lean management. The most commonly used and effective lean tools are introduced in the theoretical part of the study.

The second topic is lean in an office environment. Lean was first created to improve processes in factory floor in manufacturing facilities (Lean enterprise research center, n.d.). In the factory floor employees often have a clear set of tasks and responsibilities and the work is very visual. Anyone walking into the factory floor can see what is going on and also see if there are some defects in the processes. In the office the situation is very different. The work is done mainly in computers and by emails and phone calls. For an external viewer it is very difficult to see what the office employee is currently doing. Also the work requests come to employees directly – commonly to their mailbox – so an external view cannot tell the size of the workload at any given moment. (Locher, 2013). People in the office like to organize, prioritize and finalize the incoming requests themselves (Torkkola, 2015, 49). Because of the difference between manufacturing floor and office work is so vast, it usually comes with great problems when lean tools are being implemented the same way to both manufacturing and office (Locher, 2013). Common lean tools

require a little bit of modifying in order to work better in an office environment.

The theory part of lean office is built for a large part from real business life experiences of office lean transformation. Several books, scientific articles and internet sources have been used to found out the best lean office solutions and the potential difficulties there may be in office lean transformations.

The last topic of the thesis is change management. It is basic human behaviour to resist change and have fears towards change (Kotter, 1996, 22). Lean transformation is one of the largest changes the company can decide to take as it changes the entire organisational culture. The management needs to have a clear plan how to overcome this change resistance and motivate and engage people towards the change. Without change management skills and understanding of how employees can be influenced to accept change, the lean transformation will hardly be successful or at least it will not become a permanent way of doing business.

The study provides all people in management positions with basic knowledge on change management. It focuses on the key factors of motivating and engaging people as well as the best approaches to managing change.

The theoretical research on these topics as well as the empirical study done in Metso Minerals Tampere and especially the logistics and invoicing team both aim at finding the answers for the research questions; finding most suitable lean tools for office environment and helping managers build motivation and engagement in their teams in lean transformation.

1.2 Background and motivation of the study

The writer of this thesis works as a team leader in a team of office professional in a more than a hundred years old manufacturing company, Metso Minerals. The factory manufactures heavy machinery for mining industry. The office team behind this study is responsible for handling the transportation and invoicing of these heavy machines. In addition the team's support is commonly needed for sales activities, product design and production planning.

Metso Minerals is currently ongoing lean transformation. A roadmap for implementing lean tools as well as new leadership methods have already been taken into use (Metso, 2015a). The plan for transforming the factory lean is the same for both factory and office employees. The attitudes towards lean transformation in the office have so far been less than ideal. Although some of the lean tools have already been implemented and are a part of the everyday activities, there is still some doubt if the lean transformation is really something that will really be there for the long run, or if it is just another change that will not change anything and will

eventually be dropped. Normal change resistance, fears and doubt are still there and behaviours signal that people are not buying in a hundred percent.

The motivation for this study comes from the writer's own professional interest to make the office team's own lean transformation as successful as possible. Altogether a team leader can measure his or her success only by the success of the team. The writer wishes to found out, how the lean tools can be improved to fit office environment better. The writer believes that with lean methodology the team can improve its results and serve its customers – external and internal – a lot better. Also the writer feels that it is possible to even out the workload between team members and also on the timeline. As a team leader it is the writers challenge to make her team members believe that these are possible with lean transformation. The writer wants to learn about change management, motivation and engagement as much as possible to help her team meet the great lean transformation challenge.

The thesis can be used by anyone looking for information on lean management or change management, but it is most useful for people in leadership positions that are faced with lean transformation and especially working with office professionals. This study can be used by the writer's colleagues in her workplace. The learnings of this study can also be used in many other companies as well. As it provides basic information on lean methods, it can be used in companies that have not yet started their lean journey.

1.3 Research questions

1.3.1 Finding suitable lean tools for the office environment

Lean transformation, which is a large organisational culture change, is currently ongoing in the writer's workplace Metso Minerals Tampere. The lean journey has been ongoing for two years now and a set of lean tools have already been implemented into practise. The tools are implemented both to the factory floor and to the office teams.

In the logistics and invoicing team the implementation of lean tools has had a little sceptical welcome. The attitudes towards lean tools vary as people are not yet seeing significant improvements by using the lean tools.

The thesis focuses first on this question:

What are the best lean tools to be used in an office environment?

- What are the office processes that are not flowing in the value stream currently?
- How can lean methods help improve the processes in the office?
- What lean tools are currently being used to improve the flow of office processes?
- Are the selected tools improving the flow as well as they can?

- If not, should other tools be selected or could the already implemented tools be modified for office needs to make greater impact?

The thesis aims to identify the problem areas in the office environment related to lean themes flow and visibility and to provide suggestions of what could be the best possible lean tools, modified especially to the office environment, that would result in improved efficiency and customer value and on top of this improved employee satisfaction.

1.3.2 Finding best management approaches to improve motivation and engagement

The second phase of the study is about change management, especially motivation and engagement.

The second research question is:

What are the best methods that the managers can use to improve motivation and engagement of their employees in lean transformation?

- What are the employees' attitudes and reactions to lean transformation?
- What management methods, that need to be adopted to support lean transformation, have been identified by the management group at Metso?
- What are the best management methods that the team leader of logistics and invoicing team needs to adopt to improve the success potential of the team's lean transformation and to build motivation and engagement of the team?

As an outcome this thesis offers change management and leadership guidelines in lean transformation for team leaders and managers of office professionals. It studies in practise what changes are already being made and should be used by all managers in Metso Minerals Tampere to support lean transformation. The goal of the study is also to offer a theoretical approach on best practises about how to motivate employees, engage them to the desired common goal and how to overcome change resistance in most common practical issues.

1.4 Scope of the study

Metso is a global company, but the research is done observing Metso Minerals Tampere Factory and especially the logistics and invoicing team in the office environment. Tampere factory's lean transformation is already ongoing, and the empirical study observes the logistics and invoicing team's attitudes and reactions to the lean tools already implemented.

This study can be used by team leaders and operational managers in Metso Minerals Tampere. Although most of them are in charge of manufacturing operations, still some for example the procurement team faces the same

challenges as the logistics and invoicing team in the lean transformation. The organisational culture is also the same in all teams of the factory. This study can be used also by managers in other companies that have accepted the challenge of lean transformation.

1.5 Structure of the thesis

The first chapter of the thesis is an introduction to the thesis topic. It includes a short description of the theoretical topics presented in the study and defines the research questions. It describes also the motivation behind the study and the structure of the thesis.

Second chapter is the theoretical study from literature, scientific articles and professional internet sources about lean management, lean office and change management. It also includes a short literature review on the topics chosen.

The third chapter describes the research methods from both theoretical and practical point of view.

The fourth chapter is the empirical research done at Metso Minerals and especially the logistics and invoicing team. The study provides the reader with the background of the management decision to start lean transformation in the factory. It describes what has been done in the beginning of the organization's lean journey and how it has been welcomed by the employees.

Next chapters include analysis of the findings of the empirical study. The results are compared to the theoretical research. These chapters provide the answers to the research questions; how lean tools could be modified to serve the needs of the specific office team and how team leaders can build motivation and engagement in teams towards lean methods. These chapters include practical guidance to team leaders handling lean transformation.

The seventh chapter summarizes the result of the study.

The last chapter of the thesis is evaluation and contribution of the thesis. It evaluates the research methods chosen, the research process itself and the validity of the outcome. This chapter also describes shortly the contribution of the study to the workplace. The research results can be used by other managers in other companies as well, as long as they remember to choose the lean tools and leadership techniques wisely according to their own situation.

2 THEORETICAL RESEARCH ON LEAN MANAGEMENT AND PEOPLE LEADERSHIP

This chapter describes what is lean management and how company leaders can lead lean transformation. Strong focus is on lean management in an office environment.

Lean transformation is a large organizational culture change, so also the basic principles of change management and leading change are described in this chapter. It also provides leaders with information on how to motivate and engage people.

This chapter is based on professional literature, scientific articles and professional internet sources about lean and change management. There are numerous references available on lean management. However, there isn't a simple answer on what is lean management. Instead there are almost as many descriptions as there are authors, since the authors focus on different aspects of lean management. Many of the lean books and articles focus on implementing lean tools. And there seems to be dozens if not hundreds of lean tools available. In this thesis only those lean tools that are used by Metso Minerals Tampere or are relevant to office environment are studied in detail. The literature is often criticized for focusing too much on lean tools but not really giving management answers how to engage people and how to make lean philosophy a permanent way of doing business. Womack was the first western author to study lean in his book The Machine that changed the world from 1990 (Lean Enterprise Research Center, n.d.), which focused on how using the lean tools made the organisation more efficient. Later Womack and Jones (1996, 10-11) realized that they needed to provide the managers with practical guidance how to turn their companies lean instead of just implementing a set of tool. Recently the focus on literature has turned to creating lean culture and leading lean transformations. There topics especially by Mann (2015) and Liker (2003) are used in this research. Literature of lean in office environment, especially by Bell and Orzen (2010), is also studied in this thesis.

Browsing through references about lean management it is easy to see that many writings are based on real corporate experiences and the best approaches to lean found in specific corporations. Naturally there is academic literature, but more and more books and articles are written by consultants, entrepreneurs leading lean enterprises and managers that have successfully lead lean transformations. One of the most important reference books for this study is the book by Torkkola (2015), who has successfully transformed the IT department of Patria into lean, which is an excellent example of a lean transformation in the office environment of professional with Finnish personal characteristics.

2.1 What is lean management

2.1.1 Background of lean management

The idea of lean originates from Japanese automobile industry and especially to Toyota manufacturing that used lean leadership idea first in its car manufacturing plant and later spread it leadership ideas to its entire supply network. The Toyota production system was originally created by Toyota chief engineer Taiichi Ohno. (Liker 2003, Womack 1990).

Ohno understood that the key to maintaining efficiency, quality and flow through the processes was in considering the manufacturing operations as a complete system instead of a series of separate work phases. As a result all Toyota workers started to look for waste in all forms – cost, time and effort – and eliminating it. They were empowered to make changes and improve the system as problems arose. (Urbance, n.d.).

Inventory buffers between processes and the suppliers were reduced or eliminated to promote a continuous manufacturing flow. In case there was a manufacturing problem, it had to be addressed and solved immediately instead of leaving them until the end of the line. As a result quality of finished products was nearly perfect and hardly any rework was required. Efficiency and quality was greatly improved by waste reduction and continuous improvement. Communication was critically important to maintaining the production flow steady. Information also flowed easily from manufacturing to engineering and other office departments. This allowed office professionals to understand how their decisions would greatly impact the manufacturing process. More informed office professionals were better able to support the manufacturing system and also sales. The open information flow meant also the office professionals were responsible for continuous improvement. This improved the Toyota's performance and quality even more. (Urbance, n.d.).

Taiichi Ohno's leadership ideas were made popular to the western world by James Womack. Womack's bestselling book The Machine that Changed the World described very sharply the massive performance gap between Toyota and General Motors. Womack pointed out the key principles of Toyota's superior performance and called it lean production. (Lean Enterprise Research Center, n.d.).

2.1.2 Definitions of lean management

There are several different definitions on lean management in literature and scientific articles. There are simple and straightforward descriptions of lean that are very different and still all correct. The difference is in perspective and what lean principle is given most emphasis.

Eric Ries (2011, 48) focuses on value in his definition: "Lean thinking defines value as providing benefit to the customer; anything else is waste."

According to Shingo (1987) lean is first about finding and eliminating waste. This seems very limited and simple but it is actually really smart as when a company is able to eliminate all waste, it is left with an extremely efficient processes and highest value to the customer.

Also Masaaki Imai (1986) points out the importance of value to the customer: ”All of management's efforts for kaizen boil down to two words: customer satisfaction.”

Kaizen or continuous improvement is also focused on the definition by Rouse. According to Rouse (2013) lean management can be described as a method for running an enterprise that aims to continuously improve its processes in order to improve efficiency and quality.

The above definitions focus on customer value, waste and continuous improvement. Womack and Jones have managed to add also the flow aspect of lean into their definition. Womack and Jones (1996, 15.) state that lean management allows companies to “specify value, line up value creating actions in the best sequence, conduct these activities without interruption whenever someone requests them, and perform them more and more effectively”.

In this study the strongest emphasis is given on Liker’s approach which includes both lean tools and efficient processes but also respect for people and human motivation. According to Liker (2003, 6) lean management creates operational excellence from using tools and quality improvement methods but even more importantly the operational excellence comes from understanding people and human motivation.

Liker (2003, 34.) also states that lean thinking is not a set of tools, but instead a sophisticated system to which all the lean tools contribute to. Supporting and encouraging people to continuously improve the processes they are working on is at the very heart of the system.

Koenigsaecker has found in his thirty years of benchmarking operating and management practises of lean companies, that Toyota is the best or coequal to the best in the world in every area of organisational practise. This consistent first-class performance in all business areas is what separates Toyota from the rest, and therefore Koenigsaecker’s ultimate definition of the lean is simply “whatever Toyota does”. (Koenigsaecker 2013, 9).

2.1.3 Lean organisation

To understand why lean can be defines as “Whatever Toyota does”, it is important to understand what are Toyota’s management principles and what are elements that make it so great. In the book The Toyota Way Liker (2003) describes the Toyota way as having four main elements. First Toyota’s organisational culture is built on a philosophy, which is adding value to the customer and building learning organisations. Toyota is next a process-oriented company and it aims for best quality at lowest costs with

highest safety and morale of its people simply by making the processes flow. Third element of the Toyota way is supporting it's employees to constantly learn and improve their work. It encourages and empowers them to make corrective actions when needed by creating a sense of urgency. In the highest level of Toyota way is organisational learning and using rootcause analysis tools to prevent problems from never occurring again. (Likes 2003, xvi). Liker (2003, 6) has managed to draw an excellent image of the Toyota way which is shown in figure 1.

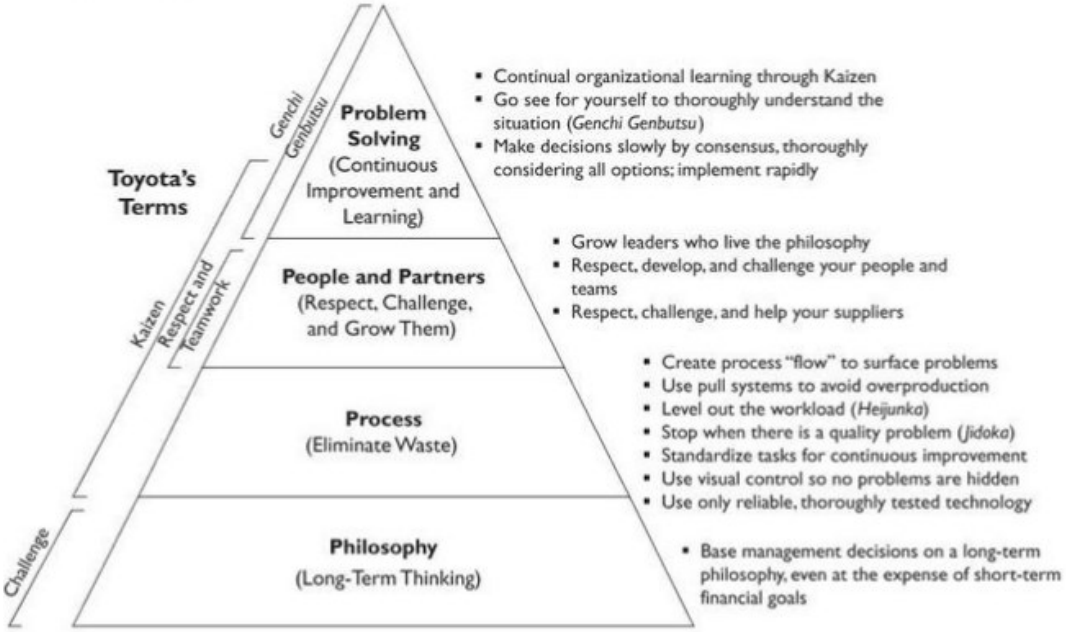

Figure 1 Jeffrey Liker's model of the Toyota Way (Liker 2003, 6)

Toyota way is often also pictured as a lean house. Lean house presentation was first created by Toyota manager Fujio Cho (Liker 2003, 32). Lean house is a structural system, with a foundation, walls or two pillars and a roof. People are inside the house.

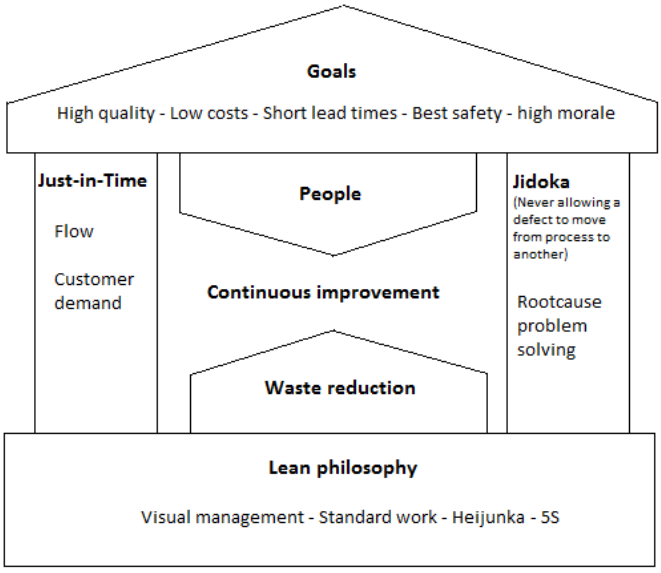

Figure 2 Lean house (adapted from Liker 2003, 33)

In the bottom of the lean house are the basic tools that bring stability to the organisation. The two pillars are the operational principles that make operations really effective. With the best processes the company is able to reach best results. The goals are in the roof. Inside the lean house are the people who are responsible for finding and eliminating waste and for continuous improvement. (Liker 2003, 32-33).

2.1.4 Key lean management principles

Womack and Jones (1996, 10.) focused on five lean principles to be used by an organization that aims to be a lean enterprise. These five principles are:

1. The organization needs to specify what creates value from the standpoint of the end customer.
2. Identify all the steps in the whole value stream, eliminating whenever possible those steps that do not create value.
3. Make the value-creating steps occur in tight sequence so the processes will flow smoothly toward the customer.
4. Only make what is requested by the customer just-in-time.
5. Aim for perfection by continuously improving the processes and removing layers of waste.

The first principle requires that the organization knows its customer and places the customer first. Without understanding what the customer wants and what the customer *values*, an organization runs the risk of producing a wasteful quantity of goods and services that the customer does not want or need. (Womack & Jones 1996, 16-19.)

The second principle centers on determining the *value stream*, which is the entire set of the organizations activities. The goal of such mapping is to identify any activities that don't provide value to the customer. Once those non-value-adding activities are identified, they are to be eliminated. (Womack & Jones 1996, 19-21.)

Third principle says that every effort should be made to make the remaining steps *flow*. All steps and activities from design to delivery to the end customer should be structured to minimize downtime, waste or waiting within or between the steps. To make operations flow in a seamless manner often requires substantive changes in production and service processes. In fact, it may require substantive changes to the structure of a business. (Womack & Jones 1996, 21-24.)

The fourth principle means that the production of goods and services is triggered by *customer demand*. The value stream activities are not started until customer has expressed demand. The lead time for creating the product or service takes a lot shorter time when the focus is on serving this particular customer request instead of a batch. The benefit on working only after there is customer demand, is that the organization doesn't need large inventories that bind capital and the company also doesn't need

demand forecasts that usually are not entirely accurate. (Womack & Jones 1996, 24-25.)

The fifth principle is pursuing perfection, or *continuous improvement*. The previous steps will turn processes very effective and after there is customer demand and busy schedule to finish the customer request as soon as possible, the possible defects in the processes will come very clear, and can be corrected. One source of potential for getting closer to perfection comes from transparency, as all the people involved can easily spot development areas. (Womack & Jones 1996, 25-25.)

According to Koenigsaecker (2013, 19.) a company does not need to reach perfection or its goals all the time, but what matters is that the quality and results of the operations became closer to the targets or the ideal situation every time measured.

The fifth principle is the well-known concept of continuous improvement, which in the concept of lean is often called kaizen.

2.1.5 Kaizen

According to kaizen institute the term kaizen means the practice of continuous improvement. Kaizen was first introduced to western companies by Masaaki Imai in 1986 published book Kaizen: The Key to Japan's Competitive Success (Kaizen institute, n.d.). According to Imai (1986) kaizen means all the activities that aim towards continuously improving all the company's functions and processes and involve all employees from the CEO to the assembly line workers. Additionally Imai (1986) states that kaizen applies to all processes beyond manufacturing, such as purchasing and logistics, and can be spread to the entire supply chain.

Liker (2003, 24.) states that the cornerstone for all kaizen activities and continuous improvement is the Plan-Do-Check-Act(PDCA)-circle and often also as the Deming circle.

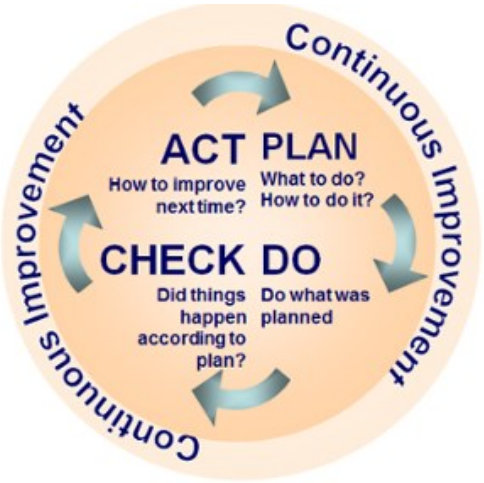

Figure 3 PDCA circle for continuous improvement (Gerard, 2013)

According to Rother (2010, 142-144) in the first phase all employees need to have a clear vision on what are the goals and how they plan to get there. They should also know what are the issues they are trying to change and how they expect their plan to affect those issues. Torkkola (2015, 38.) however says that many managers and specialists often then to plan their work as far as possible, but this is useless in the teams where you don't know what kind of requests are expected next. So rather than planning endlessly, employees can move onto doing quite quickly once they've figured out a basic plan for finishing the day's tasks.

So the next phase after planning is doing. If there are any problems, all employees in the organisation are responsible and empowered to find solutions that allows them to continue their work. (Rother 2010, 142-144).

After the work is finished, it is time for the checking. The worker gathers a list of what didn't go as planned and shares it with others, so others can solve the same problem faster if it occurs next time. (Rother 2010, 142-144).

The last step of the PDCA-circle is Act. This aims to take countermeasure to the problem identified earlier in the process. The problem is evaluated to find root cause. Root cause analysis tools 5 Why's and A3 problem solving are both excellent tools for evaluating the work processes and implementing kaizen. The root cause analysis aims to identify the underlying reasons behind the problem. Countermeasures are then taken to stop this problem from occurring again. The rootcause analysis does not aim to fix the problem that occurred, but to prevent it from happening again by fixing the underlying problem. (Liker 2003, 221-266). After the corrective actions have been taken the PDCA-circle starts again so in the next round the process is improved even more.

2.1.6 Value stream

According to Womack and Jones (1996) companies need to first understand that in the beginning of lean transformation only a small part of its daily activities, efforts and the total time spent are actually adding value to the end customer (Lean Enterprise research center, n.d.). Koenigsaecker (2013, 11) states that 95% of the time spent on a certain product or service and 95% of the work steps done don't add value at all. It is not always easy to see, what adds value and which doesn't. One easy step to figure this out is to ask is the end customer willing to pay me to do this job.

Obviously not all of the non-value adding work can be eliminated. Typically only 5% of manufacturing production activities actually add value, 35% are necessary non-value adding activities and 60% add no value at all. Eliminating the nonvalue adding activities – waste – is thus the greatest potential source of improvement in corporate performance and customer service. (Lean Enterprise research center, n.d.).

Before a company can start eliminating waste, they must figure out what worksteps exactly adds value, what is necessary even though not value-adding and what doesn't add value and is clearly unnecessary. So the company must open its processes to small steps and actions and revise each step if they really add value to the end customer. (Koenigsaecker 2013, 11-13).

2.1.7 Gemba

In lean philosophy the leaders should be perfectly aware of what goes on in the daily work. According to Koenigsaecker (2013, 13) leaders should be a member in all improvement teams, so they know the processes in details and can help and advice employees make the necessary improvements.

Gemba has the same goal. Gemba refers to the place where value is created. In a manufacturing company it is the factory floor, but there are problems that require observing also in the offices. The idea of gemba is that the problems are visible, and usually the best solutions to those problems and improvement ideas come from seeing them happen in real time. The gemba walk is an activity where leaders go to the factory and other workplaces to look at what is going on and to find improvement opportunities or waste. The purpose of gemba is also to identify existing safety risks, ask about the practiced standards and build relationships with employees. (Flinchbaugh, 2011).

2.1.8 Eliminating waste

One of Shiego Shingo's (1987) most famous quotes is "The most dangerous kind of waste is the waste we do not recognize." Companies need to start learning to actively find and eliminate waste. In different references there are usually seven or eight different resources of waste mentioned. Here is a description of eight types of waste to look for.

Figure 4 Resources of waste (Schipperheijn & Verhasselt 2014)

All unnecessary *transportation* is waste according to lean philosophy. For example transportation from a warehouse to factory is waste, as you could simply order the items in time straight from the supplier to factory for demand. All movement in factory level as well can be waste as well and also comes with a risk of damage to the product. (Carreira, 2004, 60).

Inventories of all kind – raw materials, components, WIP (work-in-process) and finished goods – are all forms of investment. When these inventories are not being actively used to meet customer demand, they represent a waste of capital. (Carreira, 2004, 57).

Motion or movement refers to employees and equipment, where transportation refers to components or products. Unnecessary motion is a waste of time and effort, and thus money. (Carreira, 2004, 64).

If components or products are not being processed, then there is *waiting*. This represents a waste of investment. There is also waiting between the steps in the value stream, as people wait for answers to their emails, or wait for another step to be finished first by someone else. This represents a waste of peoples time. (Carreira, 2004, 64).

Overprocessing means, that in case a specific job takes longer to finish than estimated, time is wasted. Using inappropriate or excessively complex manufacturing processes or tools usually creates this type of waste. (Carreira, 2004, 61).

Overproduction on the other hand means processing more products that the customer wants at a certain point of time is waste. In an ideal lean company there would not be inventories for finished products as there weren't any overproduction. Overproduction always leads to finished goods inventories. (Carreira, 2004, 54).

Peter Drucker said that "There is nothing as useless as doing efficiently that which should not be done at all". There is a major difference between effectiveness and efficiency that comes from doing the right things and doing things right. This is related to overproduction, and sometimes it is really difficult to see that the workstep is actually not required at all. (Drucker 2006).

Underutilizing people's *talent*, skills and knowledge is the last source of waste. According to lean philosophy all employees in all organization levels should be involved in kaizen, but in many traditional and hierarchical organizations it is not easy to recognize the value of an improvement idea from all levels of the organization. Not engaging or listening to employees leads to lost time, lost ideas, lost improvement suggestions and learning opportunities. (Liker 2003, 29).

Defects and errors in products produce the most expensive waste—rework costs, scrapping costs, or costs of delay. A product or service is being worked in the flow of work steps, until someone spots a defect. Up until that point there already has been costs of labour and materials, but when

the defect is noticed the costs really start to accumulate and all of those costs are pure waste. There is re-engineering, moving materials to quality inspection, part returns and reclamations, reporting and documentation, rework, ordering and transporting new materials and the list continues. The later the defect is spotted in the production line or work flow, the higher the costs. (Carreira, 2004, 63).

Jidoka, which essentially means never letting a product or service with a defect move from one process to another, is a very important principle which helps avoid waste caused by defects. Jidoka, sometimes defined as automation with a human touch, aims to free people from observing the machine quality, but it can also be view as error proofing in all business functions. Jidoka stops the work process immediately when an error is spotted and the work should not continue until the problem is fixed, putting pressure on instant and effective problem solving. (Liker, 2003, 32)

2.1.9 Lean 5S

5S is a Japanese method for workplace organization. The 5S's – Japanese words ”seiri”, ”seiton”, ”seiso”, ”seiketsu” and ”shitsuke” – all represent different phases of the workplace organization. In English they translate to "sort", "set in order", "shine", "standardize", and "sustain". (Ho et al. 1995, 19-24)

Hirano (1996) describes the 5 S's as follows:

- The first phase sorting is about separating the necessary objects from the unnecessary and removing those that are not needed.
- In the second phase the workplace is set in order. The layout is planned in a manner that items can be easily taken to use and put back. Items are set to logical and visually clear places.
- Shining is a process of cleaning and refreshing the workplace, making the workplace shine. It makes the working are peaceful and aesthetically pleasing. While making the workplace shine it is important to pay attention to possible problems that are visible in the workplace and solving those issues immediately.
- Fourth phase is standardizing which means that the new shining workplace set in order is continuously maintained. This also includes the visual management aspect of 5S, which means the practise of using visual aids to make communication simple and effective.
- Sustaining is the last phase of 5S and it means keeping the workplace at its standard level of organisation. This requires changing employees' habits as it is not enough to just keeping their own workplaces in standard condition. Sustaining means that everybody is responsible for sustaining the standard everywhere in the company.

The 5S methodology is said to have several benefits. According to Ho and Cicmil (1996, 45) using 5S increases organizational performance and productivity. It also improves organisational communication and overall

employee involvement. Ho and Cicmil also stated that 5S increases overall quality of the products and processes. Withanachchi et al (2007, 168-177) stated that 5S also leads to better understanding of customers' needs and better relationships and communication with customers. This results in better long term strategic vision.

5S brings benefits to the company also from people point of view. Withanachchi et al stated that 5S brings improved job satisfaction and higher levels of employee motivation. According to Kumar et al (2007, 483-496) 5S improves team spirit and co-operation in teams and between teams. Van Patten (2006, 55-59) said that 5S improved positive values and more positive self-image amongst employees.

According to Lanigan (2004, 70) 5S methodology is a good foundation for successful lean manufacturing. Pojasek (1999, 97-103) states that 5S is the starting point for any continuous improvement activity. In his mind 5S enables employee involvement and empowerment to motivate them to want to embrace lean manufacturing. Both the authors think that all the efforts to remove waste and organise workplaces set the employees up with the right skills and attitudes for the lean transformation. They add that without 5S all other lean tools are ineffective.

2.1.10 Stabilizing workload

According to Toyota manager Fujio Cho the first thing when you are trying to apply lean methods is to even out production levels. The company cannot establish any standard work routines if the workload fluctuates from day-to-day. Heijunka means levelling out the workload in terms of volume and variety (Liker 2003, 113). It enables companies to efficiently meet customer requirements while keeping the workload steady, which helps keep inventories, costs, waste, interruptions and lead times to a minimum. (Lean Enterprise Institute n.d.).

If the products are build-to-order, the production levels will vary from week-to-week or month-to-month very much, because customers are not predictable. In one week a company needs to pay overtime, the next it's machines are underutilized and people don't have work to do for the entire day. Built-to-order processing also leads to large inventories as the company does not know which materials and in what quantities they will need. In the Toyota manufacturing it has been noticed that levelling the production schedule, and not producing by order, is the best way to ensure flexibility, provide better service and quality. (Liker 2003, 114).

Another set of Japanese words linked to lean are "muda", "muri" and "mura". In English they translate to waste, overburden and unevenness. Most of lean manufacturing efforts often focus on eliminating waste, muda. But it alone can at worst hurt the productivity of the people and risk stopping the entire production flow. It is just as important to eliminate also muri and mura. Heijunka is the method that helps decrease muri and mura, overburden and unevenness. (Liker 2003, 114).

According to Liker (2003, 115) Taiichi Ohno once said: " The slower but consistent tortoise causes less waste and is much more desirable than the speedy hare that races ahead and then stops occasionally to doze. The Toyota Production System can be realized only when all the workers become tortoises." The fast and jerky little rabbit represent muri and mura, while the slow and steady tortoise represents the stability that lays the foundation for other lean efforts and leads to better results.

Ways of levelling workload

- Production volume levelling: Plan production levels according to long-term average and keep a small inventory to deal with variable demand. This works best when the volumes are high and product variety is low. (BusinessKnowledgeSource.com, n.d.)
- Product type levelling: Produce small batches or even single pieces. Reserve time for the changeovers. Creating several products during a day or week will increase people's ability to do changeovers quickly so time lost on changing product type is decreased to a minimum. This levels the demand for certain components and reduces the total inventories, when components can be ordered only for this small batch at the time. (BusinessKnowledgeSource.com, n.d.)
- Service levelling: Find a timeslot in the levelled schedule to fulfil the customer's requests. Establish a standard time it takes to deliver a service. This is commonly used in service business. (Liker 2003, 123)

For the purposes of this thesis the last method of implementing heijunka is the most important as office work is mostly about producing services, information and documents, to internal and external customers.

2.2 Lean office

2.2.1 Highly variable office work

Several studies show that in many manufacturing companies, where lean has been successfully implemented into manufacturing, still struggle to implement lean into service teams and administrative processes (Locher 2013). According to Locher the problem is often in the perspective. Lean is in many cases introduced to the office environment simply as a set of tools instead of a totally new culture. So office employees may start using the lean tools, but really they don't change how work is performed or don't pay attention to the work flow. And why should they if they don't understand the principles how lean could work also in the office environment? Locher (2013) states that in many studies office employees have found lean to be discouraging as they don't get any valuable results and in the end this has led to the complete abandonment of the lean transformation altogether.

Office work is often highly variable. According to Locher (2013) the office employees find it difficult to define and improve processes because

the work is highly variable, there is a lot of multi-tasking and waiting, the demand is unpredictable and it comes from various different channels. Bell and Orzen called multitasking as a "pandemic form of overprocessing waste". They state that constant interruptions and switching from one job to another are unproductive. They wrote that according to an article by Swartz and McCarthy in Harvard Business Review distractions - even smallest temporary shifts of attention - actually increases the time to finish a primary job by 25%. Bell and Orzen also state most people require a 15 minutes time to get refocused after an interruption. Well 15 minutes might not seem so bad, but in the office the interruptions tend to be constant and so they often lead to serious productivity problems. (Bell & Orzen 2013, 54).

A report by Markovitz (2007) stated that in the office environment people have difficulties focusing on their work because of chronic interruptions from several different channels. There are no effective methods to manage the increasing burden of email. This easily results in work piling up and slipping deadlines. This leads to employees feeling overwhelmed and often feeling like they don't have any control over their jobs. In the factory floor this feeling would easily lead to hazardous accidents or close calls, but in the office it leads to burnouts (Torkkola, 2015, 25).

Torkkola (2015, 23) states that there are many types of variety in the office environment. There are differences in employees work experience and knowhow. The workload varies from day to day and responsibility area to another. There may be unexpected problem situations that need to be solved right away. Some of the workload variability comes from the organizations own rules, for example the end of the month may be busier that other times due to monthly financial targets.

According to Torkkola (2015, 25) work overloading is a major problem that prevents people from seeing any ways to improve working methods. Often people are too busy and they work so hard, that they don't have time to wonder if there was a way to do something better. So overload decreases employees' efficiency and it may also cause difficulties in prioritizing the day's workload.

Another problem in the office work is batch processing, which happens mostly in offices. In manufacturing the processes flow from one work step to another, but in the office people tend to batch work steps and usually not even notice it. What's worse is that often people don't see what implications the batching has in downstream operations (Locher 2913). People see batching as a way to organise their work day and maybe even to minimize variability, but in reality it leads to many forms of waste.

2.2.2 From chaos to optimal office efficiency

Torkkola (2015, 23) states that the three main obstacles of office work flow are variability, work overload and waste. Uneven workload and overburden result in chaos, which is full of wasteful activities. People are not able to do their work efficiently when there is much variety and too

much work and no time for any interruptions or defects. The only way to get from that chaos to the optimal capacity usage and workload is to reduce the amount of work-in-process, reduce the capacity usage and cut down on variety. (Torkkola (2015, 220).

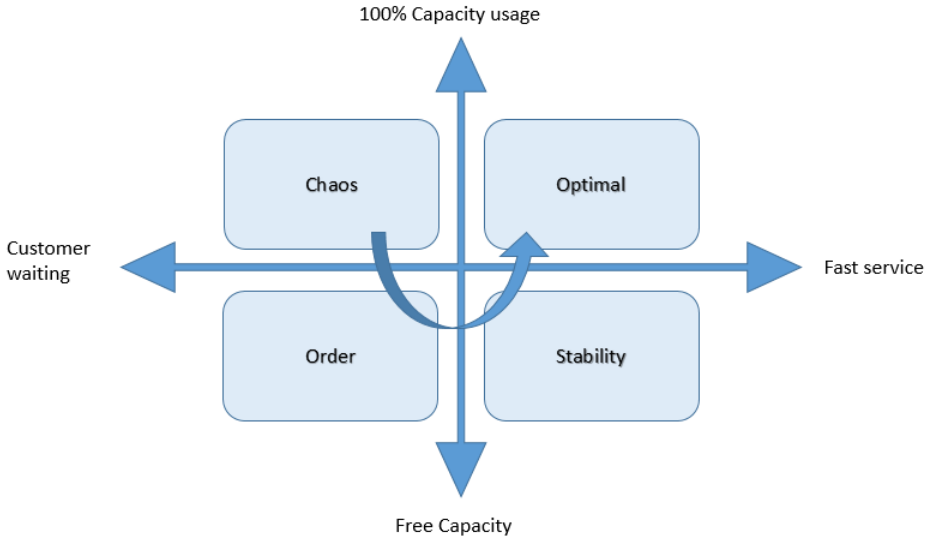

Figure 5 Workload levelling (adapted from Torkkola 2015, 220)

As a first step of levelling the workload the organisation needs to take a step back and figure out what is causing the chaos. As a first step in moving from the state of chaos to the state of order the company needs to add capacity by reducing the amount of work-in-process. That frees capacity to shortening the lead time for finalizing a job and improving processes. In this point the people's time go to improvements and may leave customers still waiting. But when the state of stability is reached, they can start serving customers quicker than before. To get from the state of stability to the optimal state the variety needs to be reduced using heijunka, decreasing defects and using simplest work methods, standard work. (Torkkola 2015, 209).

Workload levelling is the responsibility of the office manager (Liker 2003, 113). In the offices managers are not necessarily even aware of all the tasks that are required from the employees during the day. Employees need to tell their managers about the incoming requests so the total workload can be evaluated. The employees should define how long it takes to finish a certain job. When standard work is established this will be an easy step. Next the manager then can evaluate when it can be done with the available capacity of the team. (Torkkola 2015, 53). Kanban-boards are a great tool both in office and in the factory to visually manage the workload. The main goal of work levelling here is creating flow by removing muri and mura.

2.2.3 Creating flow to the office work

The chaos in the offices is usually in employees own inboxes. The 5S efforts in the office should be extended to employees' computers: cleaning the inboxes and maintaining those clutter free. Many people keep totally

unnecessary emails in their inboxes. They read them, but then mark them as unread – as if the unread mails was some sort of to-do-list – and never answer them. The mailbox gets more and more cluttered with unread emails and soon it gets very difficult to spot the truly important emails from the unnecessary ones.

The email box also contains important information and ideas that should be sent forward for others with comments. If those emails get stuck in someone's inbox, the information flow stops flowing. (Markovitz, 2007) This is again clearly waste.

Due to the nature of highly varying office work, it is easy for employees to start working on one thing, losing focus as something interrupts their work, moving onto some other job, which leads to having many half-finished tasks on their hands. Not finishing one thing before moving to another means that the value stream stops flowing. Again other employees or customers keep waiting for the job to be finished, which is a form of waste. (Markovitz, 2007)

The problem with incoming emails, phone calls and other messages bringing new work needs to be addresses within a reasonable time but short time. When the email or other request comes to the employee to handle, he or she needs to determine what to do with it. There are really only four optional actions to take: doing it, delegating it, designating time to handle it or deleting it. (Markovitz, 2007). The employee can take any of these actions, but the decision what to do needs to be done quickly, so that the request doesn't get stuck in the inbox, but continues to flow in the organisation.

In Markovitz's research (2007) it was shown that creating a time slot for being open for meetings and free discussion actually helped employees in their main value-adding work by decreasing the amount of not-urgent interruptions. An idea of reasonable response time – that can vary based on the request type – also left employees with more time to finish what they had started, as before they had felt that they would need to answer the request immediately. Also Torkkola (2015, 81) points out that there always must be some free capacity for interruptions and free discussion to avoid chaos.

Visual management board, a kanban-board is an effective tool to support flow. In the board all the tasks are visually shown and prioritized. According to Torkkola (2015, 53) it is common in the office work that employees are used to doing the work prioritizing and managing their own time themselves. Introducing the kanban-board, where requests are prioritized and started usually by the decision of the entire team based on their current workload, may feel like losing control and certain independence for many people. Kanban-board is however such a great tool for creating flow and seeing the bottlenecks that it is definitely worth implementing when aiming for lean transformation.

2.2.4 Visual management for improving flow

Visual management is a management method that uses visual images to communicate important information. This type of management allows people to quickly understand the information being conveyed. In many cases, visual management techniques make it possible for everyone in the workplace to understand the current state of work processes. (Creative safety supply. n.d.).

Torkkola (2015, 47-48) states that in Finland people are reluctant to share their open work tasks, or WIP-inventory, to others on visual management boards. They feel it is another way of controlling and feel threatened by it. But in reality the only goal is to increase openness, visibility and team spirit. The problems in the board become the team's problems instead of individual employees' problems. Also realizing that others maybe evenly loaded with work adds job satisfaction.

A good visual management board, also called Kanban-board, shows all the tasks that each individual employee in the team is working on. The tasks are shown as a list with the most urgent or important job at the top. When people see this, they are less likely to interrupt others at their work and even in case they do interrupt, it can be replied to with: " I will finish this top-priority task first and then look into you request". Managers should together with teams decide exactly how many tasks can be handled in a certain period of time, one week for example, and also prioritize all the new tasks before they are added to the kanban-board. The goal is to stop starting many tasks without being able to finish them in reasonable time, and instead focus in finishing the already started work that is prioritized highest. (Torkkola 2015, 60-66)

A good Kanban board also shows how the work flows and in what stage a certain job is. When a task gets stuck in a fixed place in the Kanban board for longer than expected, everyone can see that there is a problem in flow there (Torkkola 2015, 53).

2.2.5 Office standard work

Standard work in terms of lean normally means that every person in the organisation knows what they are expected to do and how to do it. It is at best a carefully detailed definition how to exactly do a job. Standard is the most effective way to finish a product or perform a service. When the job is done according to the standard it results in standard quality end product. The work is mapped into specific steps that are sequenced, set in suitable order and repeatedly followed. Employees finish each task according to the standard before moving to the next step in their to-do-list. (Vonderhaar & Lindquist, n.d.).

Elements of standard work (Vonderhaar & Lindquist, n.d.) can be implemented also in office environment.

- Alignment to takt time, which means that managers have allocated enough time and resources to satisfy customer demand, whether

the customer is the end-customer or an internal customer waiting for support.

- Work-in-process should be minimized, which is especially difficult in office as there are a lot of variation and a lot of waiting. Also these tasks are often piled, which adds to the takt time.
- First-in-first-out or deadline based prioritizing should also be used in the office. The entire team needs to have same prioritizing standards.
- Single-piece flow which means that employees need to stop piling work and batch processing them, but instead follow single customer request until it is finished and only then starting to work with the next request.
- The workplaces too should be standardized for increased visual clarity
- Standard work definition can also be drawn for office work. People normally remember without this guide how to perform a certain job, but the standard does help notice when there is a defect or abnormality and help people deal with those. Creating very detailed standard processes helps to finish work tasks without having to ask and wait for details from other workers.
- Key performance indicators used to monitor standard work can also be utilized in the office environment.

So there are many ways to standardize office work, but in the office employees use a lot of emails and wait for the answers to emails. Commonly they need a lot of information from several persons before they can finish a certain job, so a large portion of their time goes to just waiting. Therefore it is not so crucial how fast – according or not according to the standard – a certain step is done. It makes a lot bigger difference in their efficiency if they can reduce the time they wait for something.

The waiting comes from the fact that many parties need to be involved in finishing a task. For example organizing a transportation requires confirmation of availability from production, getting measurements weights and maybe even drawings from product planning, confirming freight bookings from possibly several transportation companies, customs and ports and creating the shipment documents which might require stamps from the chamber of commerce, where someone actually has to physically take the papers. There are so many steps and so many people involved and in between the steps and people there are almost always waiting. As one person hands off a request to another person, it takes time before that other person has the time to address the request. Thus these handoffs are seriously time wasting. Waiting can be decreased only by decreasing the number of the handoffs from one person to another. (Vonderhaar & Lindquist, n.d.).

Vonderhaar and Lindquist (n.d.) had found two effective methods to decrease the time wasted waiting. First one is a very simple “paper traveller”. This is a simple of list of actions that need to be done and by whom. The paper should be visually so clear that employees can very

quickly handle their responsibility area without searching for background information first, put their mark and date next to the task that is finished and then take the paper physically to the next required person. The paper is so visual and shows the flow so clearly, that people are less likely to put in work-in-process-piles.

Another useful method to eliminate handoffs is to have meetings that are planned simply to finish a customer request and providing an uninterrupted workslot for the involved persons to finish their tasks. The most difficult part of using this method is finding a suitable timeslot for all employees involved. But once it is found, people usually get the job done in a real short time. (Vonderhaar & Lindquist, n.d.).

2.2.6 Lean 5S for office

5S can and should be implemented also to the office because according to Bell and Orzen (2010, 43) disorganised working environments cause wasteful business practises and hide underlying problems. They also create mental clutter and chaos that make it difficult to stay focused on the job at hand. According to Bell and Orzen (2010, 43) it is smart to start a lean transformation with 5S because it raises awareness of business processes, sources of waste and improvement opportunities.

5S is a good tool to be used also in the office, but if used just like in the manufacturing it will hardly have any benefits at all. Sure it is nicer to work in a clutter free office and maybe some time can be saved when people don't need to be looking for important papers or information. But the traditional approach to 5S in the office means pretty much just moving papers from one side of the desk to another or shuffling staplers to drawers, which is actually more non-value adding work and hardly makes any dramatic change to the work processes itself.

Bell and Orzen focus on organising the virtual stuff. Information inventory appears in several places – employees' inboxes, hard drives, shared drives and data warehouses – but it is not visual the same way as inventories in the shop floor. Excess information inventory is work backlog waiting to be finished, unnecessary emails cluttering the inbox and making it difficult to spot the important emails, spreadsheets or memos for sharing information as process skips across departments and which potentially stops or slows down process flow. The excess information inventory causes the same mental chaos as the physical inventories: backlog, delays, inefficiency, errors and rework. (Bell and Orzen 2010, 43)

According to Markovitz (2007) in the offices people should view the information based on the value they carry. What kind of information or value does this paper, email, memo or note carry? It should be divided into 4 categories: Working, reference, archive and trash.

First set "Working" means the things you are working on currently. This can be for example an open order that needs to be shipped or invoiced.

"Reference" is the type of material that you need all time in many of your worktasks. A basic dictionary, a calculator, customers contact information or a worldmap printed on the office wall are all types of reference material. They don't seem important or if they made a big difference, but they make the work processes easier and thus promote flow.

Third class "archive" are often seen piling in office floors and shelves. There are many regulations stating that they must be saved for 7 or so many years, but in fact the information is most likely not needed ever again. The correct place for these piles are in the archives, and it is best to take these items away as soon as possible, so they don't keep cluttering the office or disturbing the workflow in the office anymore.

Trash is notes people don't need anymore, tools that are not used anymore, old price sheets and other clutter that is easily forgotten to the desk. This set should be easily to put away, but it is often difficult to see as obsolete trash. People often have a hard time figuring out if they still need this item or not. And for as long as these uncategorized items remain in their desks, they cause a lot of hassle and waste.

These 4 types of items and information above need to be categorized not only in the physical workplace but also in computer. (Markovitz, 2007)

2.3 Leading the lean transformation

2.3.1 Lean leadership roadmap

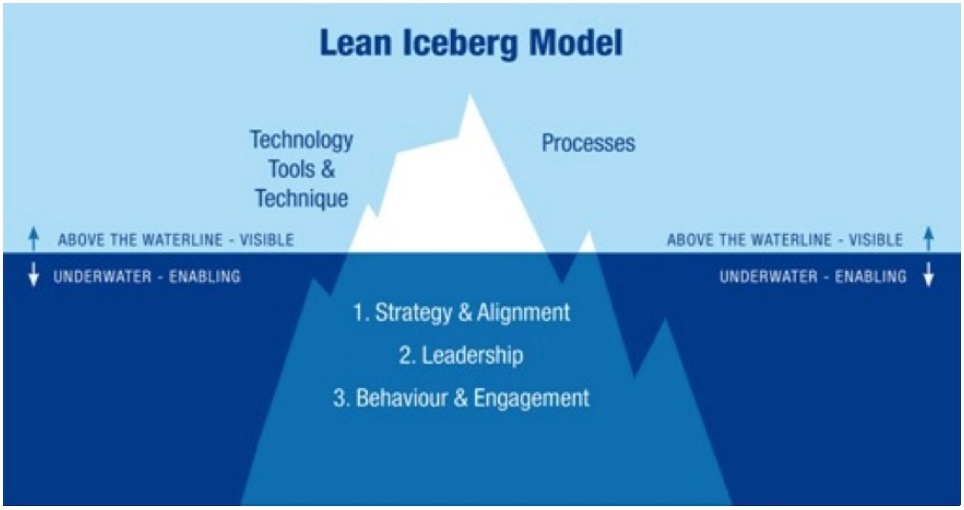

Figure 6 Lean iceberg model (Hines et al 2008)

The lean iceberg model by Hines (2008) shows that just like 90% of the iceberg is underwater and not visible, also the largest efforts to lean transformation are actually intangible. The model shows clearly that implementing lean tools simply will not be enough, no matter how many lean tools there are. The most significant factors of the lean transformation are invisible and require a lot of time to turn around. These are the elements that anchor, enable and sustain the lean processes and are all

about people, common routines, office politics and organisational culture. (Hines et al 2008).

Hines et al (2008) also formulated a model of lean business that shows the elements that are required to run a lean organisation. In the horizontal axis there are value mapping, tools and extended enterprise. The extended enterprise means that the suppliers and other external parties in the value stream are involved in the lean transformation. Larger volumes of purchases are directed to these extended enterprise partners and these suppliers also receive a lot of support in their lean transformation. When higher volumes with leaner deliveries are directed to suppliers, it helps them as well maintain a levelled production, which should cut some of their costs and create a win-win-situation for both parties. However some critics say that when companies expect their suppliers to maintain inventories it will cause trouble in terms of increased capital costs to the supplier. The key is to keep to communication open and share the procurement goals to the supplier so they can implement levelled production as well.

The lean areas in the horizontal axis can be taken to use with mere management decision, but it does not make the organisation lean or improve the business in the long term at all. In the vertical axis are the more important factors – the ones that take a lot more effort to implement into the organisation.

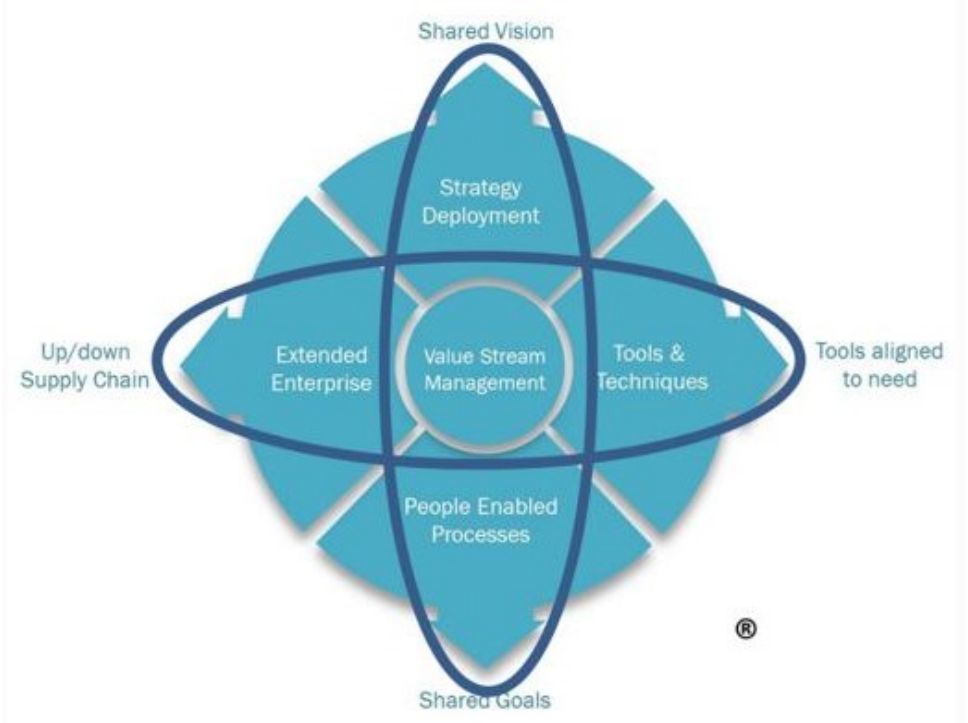

Figure 7 Peter Hines's lean business model (Davies, 2015)

Hines' business model shows that true transformation results from aligning our strategy, engaging our people, using suitable tools to improve business results and quality, utilising the extended enterprise and creating value to customer in everything the company does. (Davies, 2015). Both of these models by Peter Hines focus more on management's role in lean

transformation where Liker's Toyota way model or the lean house model are more about lean methods and lean culture.

Customer value is the first and the most important of the lean principles, yet it is often forgotten as companies focus on implementing several lean tools and mapping their far more visible value streams. Using all available tools and techniques – which is seriously a lot - brings with it two serious problems. First one is a perception that lean is all about tools rather than a new approach to business management to support continuous improvement. The second problem is the really powerful lean tools are not utilized to a maximal benefit as they get lost amongst the many other lean tools. (Davies, 2015).

Lean leaders should carefully choose what lean tools they want to utilize, but more importantly focus on getting people involved and sharing a clear vision and strategic direction to all employees.

2.3.2 True North

In the vertical axis of Hines's business model there are shared vision and shared goals. All leaders should know that it is their responsibility to share and communicate business strategy and goals to their employees. A leader doesn't need to tell the employees exactly what they should do or how they can reach the goals. Actually the employees are often more capable of doing these decisions, they only need to be empowered to make decisions themselves. Leader still needs to communicate a clear vision where the company wants to go. In lean philosophy this vision, the ultimate direction or the perfect state of business is often called "True North". (Mann, 2015, 175).

True North is a company's long-term goal that guides the organisation. Just like North Star it keeps the company on the right path towards the goal. The ultimate goal is set really high, for example no defects in production line, only value-adding activities in the organisation, only happy and engaged employees and even happier customers, who never make reclamations. This goal may be impossible to reach all the time in every process in worldwide organisations. The point is however to work relentlessly to reduce the gap between the current situation and the True North. (Koenigsaecker, 2013, 19).

The leaders should draw a clear vision of the True North, the ideal state, to the employees and then together in teams plan a roadmap for getting there.

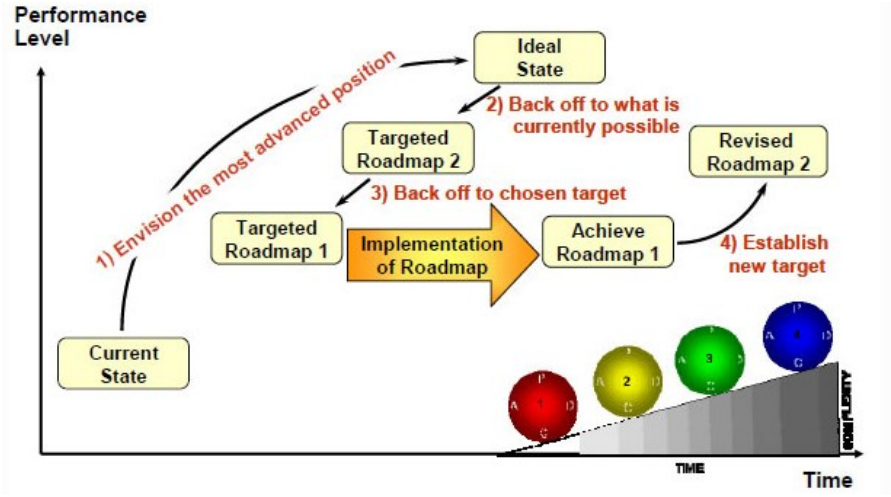

Figure 8 Business improvement (Davies, 2013)

As the team has come to an agreement about what is the current state and that True north is where they want to be, the next step is to create realistic mid-term goals that can be reached within a sensible timescale. This is the targeted future state, and the team should then create a clear roadmap how to reach this target. Creating a roadmap requires making discriminating choices of what to do at what point in time. Indeed, the more difficult choice is what not to do in the first Roadmap, as trying to do everything at once will lead to delays, frustration and poor sustainability. (Davies, 2013).

Once the first targeted future state position is achieved, a further roadmap towards the ideal state is planned. Everytime the new targeted future state is reached, the company gets closer to its True North. Planning new roadmaps using the same approach after each targeted future state is achieved also helps keep the true north in everyone's mind even if the ideal state is still far away. (Davies, 2013).

2.3.3 Supporting kaizen

Lean leadership focus areas:

- Improve stability
- Implement visual controls
- Daily management
- Draw a vision of company's true north
- Support continuous improvement and learning
- Make sure the company won't slip back into old habits (Mann, 2015)

In lean management the managers need to organize continuous learning. The manager needs to be a coach and enabler of learning. They should teach their employees analytical problem solving skills, especially learning how to use lean problem solving tools like A3-analysis and root cause analysis. Learning needs to include two elements: educating people and giving them to opportunity to practice their learnings in their work.

Continuous learning is a prerequisite to continuous improvement. (Torkkola 2015, 32).

It has been noticed that when a company is just implementing lean tools, they will possible in the beginning reach good results, but if the focus is on tools rather than culture, then the efforts will likely fade away. People will be improving processes for a while, but then stop. Maybe the new improved processes will remain or in the worst case scenario the old habits slip back into use, and the company is back in square one. Therefore it is crucially important to make sure the continuous improvement becomes a part of the company's culture. The below image shows the difference between just implementing new tools and creating a whole new lean culture. (Hines et al 2008)

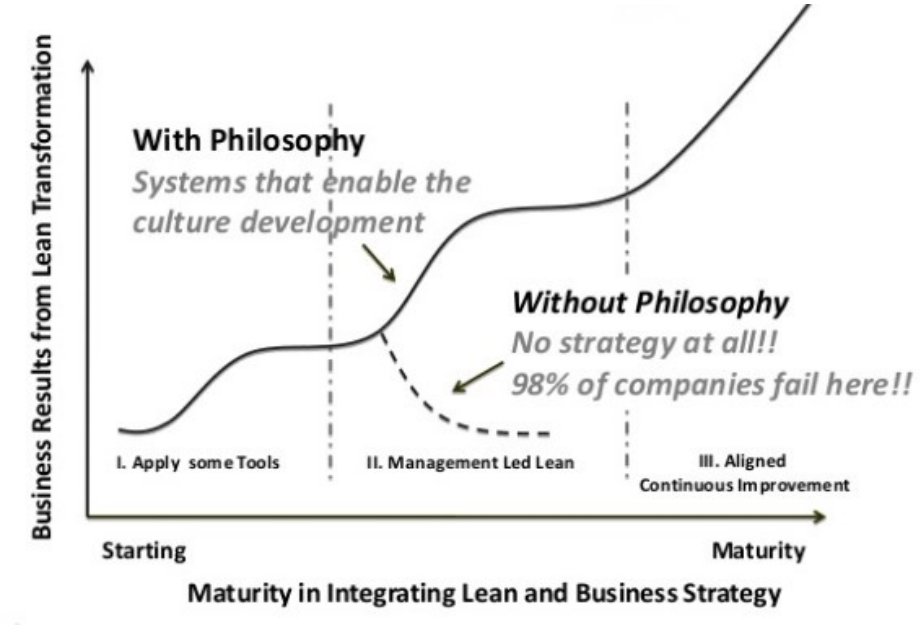

Figure 9 Lean transformation results (Cardenas, 2014)

2.3.4 Leadership

Hines at all (2008) state that it takes good leadership instead of managing to get employees to accept the idea of kaizen. It takes a set of leadership characteristics to allow everyone in the organisation to be a part in the strategy process and encouraging everyone to start making incremental changes to reduce fire-fighting and non-value-adding work. These leaders are usually people with strong vision, passion and inspirational skills and they focus on their employees and inspire trust amongst them. (Hines et al 2008).

Daily management is a term often linked to lean management. Mann (2015, 115) calls it daily accountability. The purpose of daily management is to reinforce the focus on processes and through it identify and implement improvement ideas. Daily management offers the managers also an opportunity to follow-up on the status of problem solving or

previously identified improvement ideas. Daily management as well as daily meetings on kanban boards and gemba walks also signal employees that their work is important and interesting and that management values their efforts.

2.4 Change management

2.4.1 Changing the organisational culture

Kotter (1996) has created an 8-step process for managing change. It starts with creating a suitable climate for the change. The first 3 steps are about explaining why is the change necessary, what we expect to get out of it, and who will show the organisation the way.

Next three steps are about motivating and engaging people and introducing the new methods. These steps include communicating the vision, making everyone in the organisation understand why this transformation is needed, employee buy-in and providing them with skills and resources to make the changes. Finally the first results should be gained quickly so everybody will see that this transformation works in order to increase motivation and engagement. Quick wins also influence the beliefs of the people, that will in turn improve their behaviours and attitudes towards the change. Kotter says (2011a) that at some point of the change process the company must win over the hearts and the minds of their employees.

The last set of Kotter's steps are about anchoring and strengthening the results achieved so far, making the changes stick and thus creating a new organisational culture.

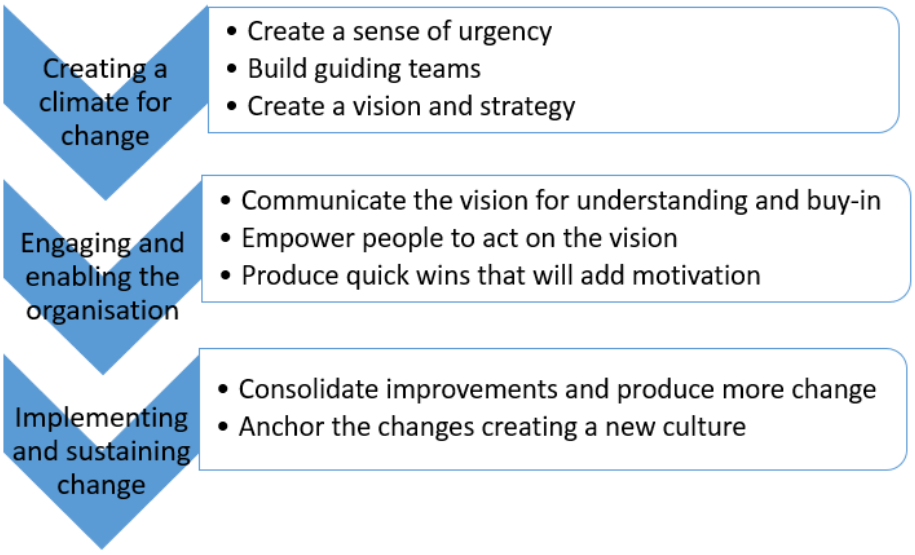

Figure 10 Kotter's 8-step to change model (adapted from Kotter 1996)

2.4.2 Overcoming change resistance

Usually changes in the organisations or simple work processes come with some amount of change resistance. It is a normal human reaction to be cautious of anything unknown and to be a little bit afraid of what the change might bring along. Many people resist change simply because of fears that drive negative behaviours. Lean transformation is huge change, changing the entire organisational culture and employees attitudes towards development activities. Therefore it is crucial that management has the right set of tools to ease employees' fears, make the change less intimidating for them and to get people to accept and be motivated to change. Understanding the resistance and working to remove it is crucial for successful organisational change. (Hines et al 2008).

Eckes (2001) has identified different types of change resistance. People first of all resist the unknown and express it through being overwhelmed by any new details. This type of fear comes simply from people being afraid that they don't have the necessary skills to do a job anymore and the lack of confidence which makes learning new things intimidating. According to Eckes the right way to overcome this type of resistance is through training and communication.

The second type of change resistance comes from feelings of loss. People feel they lose control, loss of power to influence other, loss of pride in the great job they are currently doing. Sometime the loss is real and then people must be allowed to be involved in the change process. They should be encouraged and supported in their new roles. This is difficult but crucial as without active effort to change things people prefer to maintain status quo and remain in their own comfort zones. (Eckes, 2001).

The last type of change resistance is expressed as "What is in it for me?" This requires appropriate answers and reward system. They don't need to be financial, but the employees need to feel appreciated and recognized for the extra effort they are making. (Eckes, 2001).

Kotter (2011b) has said that a good leader has to understand that the change is not for everyone and that not all employees will fit in the new vision. There will always be people who, despite all the efforts done by management to change their behaviours and attitudes, will resist the change into the bitter end. According to Kotter a good leader will understand that they must get rid of those people, because they simply consume too much energy and make it difficult to all others to accept change as well. That is why a good leader gets rid of those who resist the change and puts all his effort into those who are responsive to the change.

In the book Toyota Way Liker (2003) says, that Toyota never gets rid of anyone as the processes improve and change, but instead new work with other improvement tasks is given to them. However, according to Koenigsaecker (2013) Toyota only employs people with the correct attitudes in the first place. Instead of hiring the best talents, Toyota hires people with good teamworking skills, relationship skills and who are constantly willing to learn. A traditional company that is only starting it's

lean journey, Kotter's approach might be needed as only that way they can achieve the Toyota way.

2.4.3 Employee buy-in

Starting a large organizational change is a serious challenge, but it becomes a lot easier if at first point the management can achieve employee buy-in.
This essentially means that the employees are open, willing, and committed to making contributions to make the lean transformation a success.

Key factors to develop employee buy-in include:

- Early involvement.
- Educating employees
- Providing a roadmap for success with examples
- Allowing employees to discuss the potential barriers and pitfalls of the change with each other and the guiding team.
- Providing insight about how the process is expected to proceed to help people overcome their fears of the unknown that could hinder the process. (Creative safety supply, n.d.).

During the employee buy-in process, many employees will show excitement and interest when it comes to discussing the pitfalls and barriers associated with the new changes. Mostly the employees that buy-in in an early phase are quieter than the people reacting more carefully towards change. It is important to be able to discuss the possible difficulties, but even more important is trying to keep the positive expectations on top. Management needs to remember that positive attitudes are contagious and the negative comments must be answered quickly and then move on to positive images. Management must listen to the worries, but give optimistic answers that will help employees get onboard. In case later some of the pitfalls or barriers became real, it is a lot easier to tackle them with a positive mental attitude. (Creative safety supply, n.d.).

2.4.4 Influencing behaviours

Hines et al (2008) state that a company needs to influence the behaviours of the individuals. Negative behaviours driven by fear need to be overcome and instead lean behaviours – trust, integrity, openness, willingness to try new things and respecting others – must be encouraged.

Organisational culture is built on the social, behavioural and moral norms, which come from beliefs, attitudes and values of the individuals in the company. In order to build a lean culture, a company needs to influence behaviours. A person needs to first believe that a change is good for him or her and that the change is consistent with the person's values. Also a single person needs to be reassured that other people in the organisation would behave similarly. Finally a person needs to believe that he or she

has the right skills, competencies and resources to make the change possible. (Hines et all 2008).

Changing a behaviour is a matter of individual choice. People are more likely to buy-in when they know the reasons why change is necessary and good for them. Communication and education are the keys to motivate people towards change. Employees should not be expected to understand lean methodologies or to comply using new tools if they do not understand them or the overall purpose. So educating and motivating people plays a very large role in a successful lean transformation.

Three things must be communicated to the people:

- Why is lean introduced to the organisation?
- What outcomes are expected of the lean transformation?
- What role will each person play in the new lean organisation? (Hines et all 2008)

The same methods that can be used to face change resistance will also help change behaviours. These include in addition to communication, training, active involvement, encouragement and support as well as showing appreciation and recognition.

Kotter said that the company must influence both the mind and the heart. The heart, mainly the way people feel and how they eventually behave, is not so easily influenced. There are no specific methods or roadmaps to change the way people feel. There are numerous small things that affect people's feelings but not really anything tangible. There is role modelling, creating small positive experiences, building great relationships between people and gaining the trust of employees so they want to follow their leader and exceed their expectations. In any effort to change people's behaviours a leader should try to influence a person's emotions as well as their thinking. (Kotter 2011a).

2.4.5 Motivation and engagement

According to Juuti motivation can be defined as "the system of the factors that tune and direct behaviour". The actions of a motivated employee are not based on reflexes or the necessity of doing something, but instead it is based on willingness. The actions are done voluntarily. Employees' motivation determines how well an organization works and how profitable it is. (Juuti 2006, 37-38). Also Ryan and Deci (2000, 69) state that motivation is highly valued because it increases the employees' and thus the entire organization's productivity. According to Lämsä and Hautala (2004, 90) a employee who isn't particularly motivated is using only some 20 percent of his or her potential, whereas a motivated employee will work on 80-90 percent efficiency.

Managers can observe and evaluate employees' motivation by asking these questions: how does the behaviour start, where is it directed, how strong is it and how is it maintained. According to Juuti these are based on

three characteristics of motivation: vitality, direction and systematicality. (Juuti 2006, 37 – 39.).

According to Lämsä and Hautala (2004, 80) the employees today are not motivated by controlling and commanding. Instead they need to be motivated through their thinking and emotions that will drive them to want to make an effort. Strömmer (1999, 161) points out the importance of appreciation and recognition expressed by management to employees as method to motivate people. Positive feedback is a huge motivational factor to most employees. They often just want to hear ”Thank you” and ”Great job”, that will drive them to even better results.

Also Maslow’s hierarchy of needs shows that people need to feel belonging and accepted into a group like a working team. In that group they are then motivated first by receiving recognition and acknowledgement and it the top level from being able to learn and reach their own maximum potential. (Maslow 1943).

Other motivational factors according to Strömmer (1999, 162) are:

- Clear goal that are tough but achievable
- Feedback about the work itself as well as results
- Support
- Rewards
- Work and the workplace are something to be proud of
- Day-to-day workplace experience as positive as possible
- Appropriate workload

The only way to get continuous improvement is to find ways to continually motivate people to improve. People only modify their behaviour when there is some external motivation to do so. Otherwise, they will just remain the same or slide back to their old habits. Good leaders will actively support and encourage their employees to reach better results by building trust and showing people a route to follow. (Senge, 1992).

Strömmer sees engagement as a larger concept than motivation. Engagement is shown in how much a person is willing to do work for the company even exceeding his or her normal responsibilities. Engagement also involves accepting the company’s values and targets and the willingness to struggle to achieve those. Finally engagement is also about the willingness to stay a part of the organization. (Strömmer, 1999, 162).

Conant (2012) said that a company will not perform in a high level unless people are personally engaged. The employees will only be personally engaged if they genuinely believe that the company is engaged in making their lives better by providing interesting and meaningful work. Conant also believes in providing positive feedback and recognition to people for a good performance.

Work engagement is positively linked to the bottom line of the company’s performance. Work engagement affects positively job performance, client

satisfaction and the financial return of the company. (Bakker, Albrecht & Leiter 2011, 5). Work engagement also improves employees' commitment to the work place and decreases employee turnover. It is even said to be the key factor for a company's success. (Hakanen, 2009, 2-3). Employee engagement also is transferred to others, meaning that an engaged employee increases the level of engagement also in other employee in his or her working environment. Because organizations performance is mostly a result of team effort and the engagement of one employee increases the team's engagement, the team is able to improve it's performance level. Engagement is also related to active learning and self-development, individual's initiative at work, innovation and acting according to organizational norms. (Bakker 2010, 233-235.).

So what can a leader do to improve the level of engagement? Robbins (2012) has created a simple leadership routine, called nine minutes on a Monday, which is about engaging people to achieve high productivity. By focusing on these nine issues, the leader can improve employee engagement.

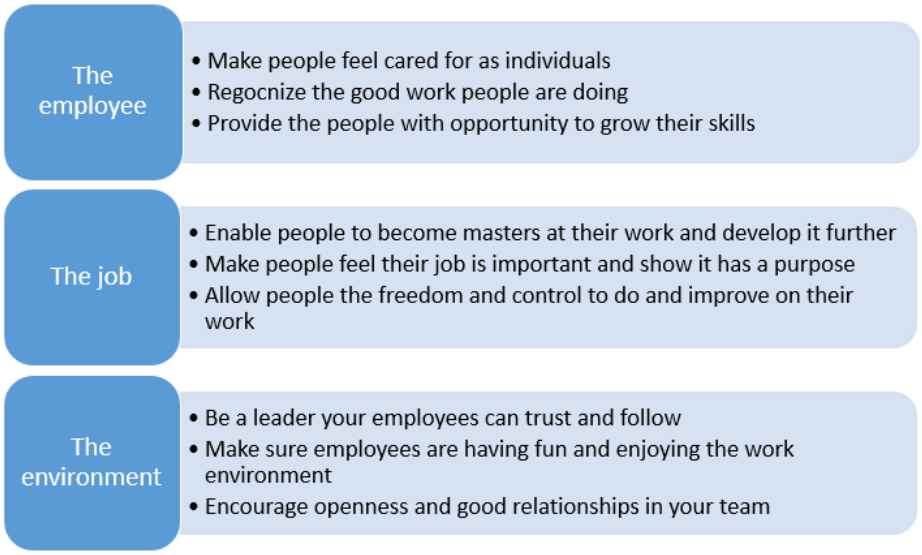

Figure 11 Checklist for building employee engagement (adapted from Robbins, 2012)

3 RESEARCH METHODS

3.1 Research approach

Ojasalo et al (2009, 39) state that there are four different methods for conducting a study. Those methods are case study, action research, constructive research and innovation production.

The first one, case study focuses on producing in depth information about a certain topic, for example a situation in an organization. This research type aims on collecting as much information about a particular carefully defined subject as possible. The focus is on collecting data and analyzing data but not so much in using it as a background for development activities. (Ojasalo et al 2009, 52-53).

The next approach, action research, is about collecting research information and creating practical development ideas for a particular research problem. It can be used for developing organizational activities and is linked to one or more research problems. Action research aims for changing the current situation. Action research includes theoretical approach and practical study about the research problem in question and uses them both to create development ideas. (Ojasalo et al 2009, 58-60).

Third approach is constructive research which is conducted in a same way as the action research. The main difference is in the results. Action research results in changing the behaviour of people in an organization and other intangible topics, whereas the constructive research results in a very concrete output, for example a new defined process model. In a lean transformation research the result could be for example a formulation of a Kanban-board. (Ojasalo et al 2009, 65).

The last type of research is production of an innovation. It is as well as constructive approach aiming for a real concrete output, but instead of an improvement to some existent issue the production innovation approach produces a completely new innovative result. (Ojasalo et al 2009, 72).

The suitable approach is chosen based on the goals of the study. This study aims to first of all improve the lean tools in the office environment, so for that purpose the constructive research approach is most suitable. It provides analysis of current tools and suggestions how to make them even better for the organization.

The second goal of the study is to find guidance to managers to engage and motivate people in lean transformation. It is not only about gathering info, but to also compare it to the related literature. For this research problem the action research approach is chosen. It is possible to use different approaches in a single research for finding the best answers, because in real life organizations the problems usually have more than just one angle.

3.2 Research methods

The research methods are traditionally divided into two groups: qualitative and quantitative (Ojasalo et al 2009, 93). Quantitative method provides numeric results, for an example a questionnaire, which has specific questions and multiple-choice answers levelling from 1-5. This is a good method when analyzing a large number of participants. Qualitative method is better when in depth analysis is needed and the group of participants is small. (Myers, 2009, 8).

There are many methods for conducting studies, for example surveys, questionnaires, interviews, analyzing documents, brainstorming, benchmarking, observation and discussion.

Observation and discussion are the methods that are mainly used in this study. Observation can be done either by observing the object outside of the situation or by being an active part of the situation and observing the situation from inside. The latter is called participant observation method. Where interviews are commonly planned ahead and are quite formal, the observation and discussion methods are more flexible and can happen at any time and the subject might not even be aware of it. It also takes a lot more time than an interview. The main benefit of the observation and discussion method is that it usually results in the unofficial story, the true thoughts and attitudes of the observed subject, whereas in the interviewing, the interviewers might answers according to what they think is the right thing to say. The observation method allows studying only a rather small group of people, but the advantage is that the result is excellent understanding of the subject's attitudes, beliefs, values and practices. (Myers 2009, 138-139).

The study is about lean transformation of a company, where people have no prior experience of lean practices. People may be afraid of the change and the tools and management approaches haven't completely sunked in yet. Lean is altogether about incremental improvements, so also the tools and methods used in the company most likely still require some adjustments. The study is done in an office team by the team leader and in the board meetings. In these surroundings infront of direct superiors people are not necessary willing to openly share their true opinions, especially if they have not yet accepted the lean change. It is understandable that they would never want to show negative attitudes towards the company goals, even if they truly thought that "the whole process sucked". Sometimes actions speak louder than words, so observation is seen as the right method for this research. Open discussion without judgement about the observations is also used in this study.

The validity of the research using this method depends highly on the time spent on observing the subject. In theory the most thorough information can be achieved by doing the observation for twelve months, but the Myers still state that in most studies in real business environment the research periods are normally much shorter. (Myers, 2009, 141-150). For this study the observation has been done in a study period of nine months.

3.3 Research in practise

This thesis is a research-based study as it focuses on the research problems found in the writer's workplace. It aims to improve the writers and readers knowledge of the topic of lean transformation as well as motivation and engagement. It aims also to provide real development suggestions to the workplace and practical tools and methods for managers in lean transformation.

Research-based study includes theoretical research on lean management, changing organizational culture and on motivation and engagement. The theoretical research is done reviewing books, scientific articles and professional internet sources about lean management, lean office implementations and change management principles. It is easy to find that the number of books and other references on lean, change management, organisational behaviour and other related topics is huge. To conduct the theoretical study the writer has first chosen a few lean books from the most important writers like Mann and Hines and a book on change management from Kotter. These form the foundation for the theoretical approach which is then extended with detailed topics from several references.

The empirical research is done using a qualitative participant observation method mostly because of the position of the writer in the company. It is the best approach to get understanding of the real attitudes and beliefs of the people working in the studied group. The group being studied is the office team lead by the writer. Writer observes her own team's attitudes towards the changes and discusses with other business units managers and team leaders what kind of change resistance issues are found and what could be the best practises to overcome those. As a team leader the writer has a great view on the office professionals, so the writer has both observed and then discussed freely the team's attitudes and reactions towards lean.

The writer of this thesis also participates in the Factory's management group's meetings that focus on implementing lean management on a weekly basis. In addition to this the writer attends board meetings that focus on lean transformation as well as motivation and engagement approximately once a month.

Benchmarking other companies where lean management has been successfully implemented into office environment is also used as background information for this study. Such benchmarking results are found in professional literature and internet sources. Also the meeting minutes of the factory's managements group's benchmarking visits to other companies are used as background information.

The first research problem – finding suitable lean tools for the office environment – is studied with qualitative participant observation method, where the team's attitudes and reactions to the tools are observed. The observations are shared and discussed with other team leaders and managers at Metso Minerals Tampere. The results of the observations are

then evaluated in the light of the literature review and benchmarking results from literature.

The other research problem – finding best management approaches to improve motivation and engagement – is done first by observing the team and then by discussing the best methods with all Metso Minerals Tampere managers. Also a literature review is used to found out if the management groups ideas of best practises are supported by literature, or what could be the best methods found in literature.

People's attitudes towards the lean in the beginning of the research period were obviously not ideal. When asked about lean from any employee, they mostly showed negative or indifferent attitudes towards lean. They said for example, that they didn't want to waste time working with lean tools, they didn't think the tools had any benefits for them, they simply thought that this was another management's stunt to make employees more productive after what they could let people go. They simply didn't trust the process. The same observations were seen by every other manager too, and I didn't feel it was necessary to document this for the purposes of the research. It was so obvious. After nine months of observation, there was a subtle shift in people's attitudes, which was couldn't be measured exactly, but was clearly visible and shown in people's attitudes and behaviours. The attitudes and behaviours of employees are not measured exactly and documented only in the writer's notes for this research. The attitudes and behaviours were yet visible, so I could easily use them in this research.

4 EMPIRICAL STUDY

4.1 Background of Metso Minerals lean transformation

In the spring of 2014 Metso was faced with a merger offer by its Scottish competitor Weir Group. At the time Metso still hadn't completely recovered from the drop of sales after the financial crisis of 2008. The merger bid offered a little more value per share than Metso's stock value was at the moment. Metso's board of directors had to decide if it was in the best interest of its shareholders to accept or reject the offer. Metso decided to stay independent, but at the same time they knew some heavy changes were needed to get Metso's stock value up again.

A few months later Metso's new strategy was released with a strong focus on improving the company's financial success and with very ambitious financial targets. It was known that Metso's mining business was dealing with poor demand in the short-term but on the long-term the acknowledged megatrends were supporting the mining business. So for Metso Minerals the strategic target was to improve the competitiveness of its offering and to develop its operating model for higher operational and capital efficiency.

The management board of Metso Minerals's Tampere factory turned to a Japanese method of lean management to help achieve this strategic target. Lean management improves the flow of processes and therefore also the productivity of the manufacturing lines. With increased productivity the costs of manufacturing are decreased which leads to competitive advantage in the form of lower end prices to customers and improved production capacity. Another benefit of lean management is the decrease of inventory value and the improved turn of inventory, which both support the corporate financial targets.

4.2 The beginning of Metso Minerals lean transformation

Metso Minerals Tampere factory started a lean transformation journey in the end of 2014. Metso Minerals Tampere Factory has about 400 employees mostly working in the factory. Lean transformation would change the organizational culture of an old industrial machining company significantly. Lean transformation is a great leadership challenge so a 5-year-long roadmap to implement lean tools was planned. It has several steps from new leadership methods to time-saving working processes scheduled to result in a lean organization by the end of 2018. (Metso 2015a).

The main focus areas for the end of year 2014 were tools and techniques and leadership. In practise this included the implementation of 5S to the entire manufacturing plant, factory floor and office spaces, as well a implementing new leadership methods visual management and daily leadership. (Metso 2015a).

Figure 12 Metso Minerals lean transformation focus areas for 2014 (Metso 2015a)

4.2.1 Implementing 5S

As the factory's most important priority had been and still was safety, naturally 5S was the first lean step that the factory would adopt. In many cases 5S is actually referred as 6S, with the 6th S being safety (Gapp et all, 2008, 565). Also Lanigan (2004) and Pojasek (1999) support the idea to start lean journey with the implementation of 5S, although the majority of authors suggest that the first thing should be creating the suitable climate for change rather than implementing tools in the beginning.

The leaders asked employees what they felt about 5S and what did they think were the benefits. The benefits from 5S recognized by Metso Minerals Tampere Factory employees were

- increased safety
- increased productivity
- eliminating waste
- adding credibility and professionalism in the eyes of the customers
- Creating nicer and more comfortable working environment
- substituting easier
- most of all it made everyday work easier.

So 5S had a great welcome from the employees, but making the changes in action was a whole other thing. First there were many visible changes on the factory floor. Pictures of hammers, drills, powertools and many more were drawn to tool boards where anyone could easily see if every item was in their place and nothing was laying around somewhere possibly causing hazards. Keeping the factory clean was supposed to be easy, and it would be great if less time was spent looking for tools and employees were not tripping to forgotten tools left on the floor.

In the beginning the items that had clear specified places and clearly someone responsible – usually the person needing that tool in his or her work – were mostly put in their places at the end of the work day. But the factory is full of random items and nobody knew if they were useful or in which workphase they would be needed. There was just all sorts of stuff everywhere, but nobody knew where those belonged to. Everybody said it would be easy to put tools away, but the random items always kept the factory looking a little messy. No one felt responsible. This is a clear sign, that the lean idea itself had not yet sunked in, as the final phase of 5S -

sustain – required that everybody took responsibility of the shared workplace.

Soon not even the tools found their places anymore. It was said that it would be easier to continue work the next day if tools were left where they were last needed. So the 5S got delayed more and more.

The roadmap or lean tool implementation schedule was in many ways directed to improve the production flows and the effectiveness of the production processes. The same roadmap however was implemented to the entire factory organization including office employees. So also the office employees started to work on 5S.

When 5S was implemented to the office as well, it felt ridiculous to many employees. People knew where their papers and important notes were even though their desks seemed chaotic at times. Management kept motivating them to clean their desks by saying that cleaning up would save time and make substituting in case of holidays or sickness easier. Offices employees mostly just started cleaning their desks at the end of the day. A picture of a standard clean workplace was put on each wall to remind employees to keep their items in order. As the pressure by management to implement 5S grew stronger, mostly because of poor success in the factory floor, the office employees didn't know what they were expected to do. Soon people started to draw outlines of mobile phones, scissors or coffee mugs on their desks and moving the piles of work-in-process –papers from one side of the desk to another. Obviously this was not increasing efficiency, not to mention customer value.

The office teams did not know what they were expected to do to improve the 5S situation of the factory anymore. From the office employees point of view the whole lean journey went from being a good idea into a joke and into plain cleaning activity and eventually just frustrating and useless. The office staff started feeling like they had nothing more to give to this lean journey and keeping their workplaces clean really had not helped them at all. This was a major problem, as the 5S effort in the office was doing the opposite of what it was supposed to. It made people feel frustrated and strained instead of engaged and motivated.

When people in the office were asked for example what were the piles of paper on their desks, they would have a long list of answers, some might say excuses, for example:

- I haven't had time to go through the piles, there might be something worth saving
- I want to take the piles to the archive in larger quantities, as the archive is so far away
- I am working on something on the pile, when clearly they were in fact doing something else.
- I might need to look for an old quote from the piles later, so I don't want to put the papers away.

The answers clearly showed that:

- Employees were too busy in their daily work to handle any additional improvement activities like taking care of 5S of their own working desks.
- Employees preferred batching instead of single piece working
- The piles included work-in-process and there was a lot of it
- Employees did not have a designated folder or other place for their reference materials and no standard way for saving the data.

What the management could see from between the lines was that people really didn't care about the 5S tool. They didn't believe in it nor did they want to make much effort in adopting it.

At this point managers should have realized that they needed to do more to create employee buy-in about 5S and they should have focused on stabilizing the workload and reducing the amount of work-in-process so people would have been able to focus on the 5S process better. But management at this point had other things there were busy on, as they were preparing for the next steps in the roadmap: visual management and daily leadership.

4.2.2 Introduction of kanban

As the first leadership steps the management board chose to start with visual management and daily leadership and to proceed with those they introduced kanban and gemba to the whole organisation. Nobody in the manufacturing plant speaks Japanese and anyone can imagine the amazement of the employees when suddenly the management gets all excited about words kanban and gemba. Nobody knew what to expect when these two leadership tools were first introduced in the factory.

Kanban means visualising the daily activities and showing how they flow from one process to another. Each team and manufacturing line have their own kanban-boards. The kanban-board created for order office including two teams - order handling team and logistics and invoicing team – is illustrated in the below figure.

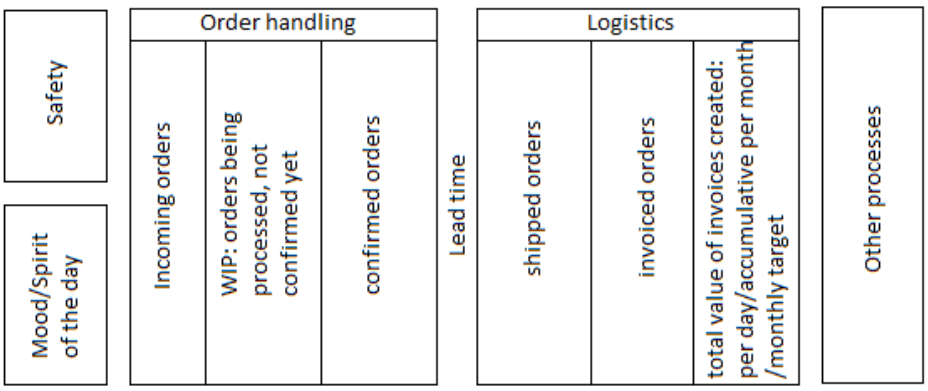

Figure 13 Metso Minerals Tampere Order Office Kanban (simplified illustration)

Every morning all the teams gather around their own kanban-boards and shortly in ten to fifteen minutes discuss what went on yesterday and what they will be doing the same day.

The morning meeting agenda for the order office is always the same:

- Have there been any safety hazards or close calls the previous day?
- How are the people doing today, are everyone in good mood or are the somethings worrying them?
- What new orders came in yesterday?
- Has someone started working on them and what's the current status? (It normally takes some days to get the configuration right, to get pricing correct and to get a confirmation about the arrival of parts from procurement and then finally to get the ready for shipment date from production planning.)
- What orders are confirmed to customer?
- What machines were shipped yesterday?
- What machines were invoiced yesterday?
- What is the value of the invoices done yesterday and what is the accumulative value of the invoices this month? What is the monthly target value of invoices?
- Are the other requests that the team members are currently working?
- Finally there is a little time for discussing other common issues when everybody is together.

The first part of the kanban board is safety. It is there simply to remind everyone in the company that safety is the number one priority of the company. The team discusses safety shortly every morning, although there are practically never any safety problems in the office. The second is single employees' moods. Employee's names are listed in the table and everyone draws a smiley expressing their feelings that morning. This is a good way of building team spirit as the most of the time people are in good moods and if they are not, sharing their concerns with others might make them feel better.

Next on the board are the main tasks of the team: order processing from order handling to customer delivery and invoicing. The process start as it should in a lean enterprise from the incoming customer order. In the table the order flows from being received to being processed to being confirmed to the customer. But then it is removed from the table because the lead times are commonly long and it doesn't make any sense to have the factory's entire order base stuffed to the kanban-board. In the next step the order is shown again in the table is when the order is shipped and then when it is invoiced. The next issue in the table is the value of invoices created. It is one of the team's KPIs, and in addition it is the main thing that interests top level managers. They often come see the board simply to see where the factory is going from the financial point of view, but at the same time they have the opportunity to show interest and appreciation to the employees in the office. The last part in the kanban-board is other issues and processes. There people should write all other requests not

linked to the order-to-delivery process, that often came to people's own inboxes.

People seem quite happy with the kanban-board and the morning meetings. It only takes approximately ten minutes of their day and really don't change anything about their day.

The kanban-board yet has a few obvious flaws. First of all the flow stops in the middle of the board, and the board does not show the activities of the logistics and invoicing team until the shipments and invoices are actually handled. Office employees also receive many requests and have other tasks that are not related to actual customer orders. Those are not shown in the board because people simply are not writing them down to the other issues section. People prefer to prioritize and handle those requests themselves without having to discuss this in the morning meetings infront of the kanban-board. The total workload of the team is thus not shown. Kanban-board also doesn't show the workload of a single employee.

4.2.3 Introduction of gemba

In addition to these morning meetings management wanted to ensure information flow also in free conversations. Everyday leadership means that the leaders should be available for their employees and that they have active discussion on a daily basis of the ongoing work processes and any abnormal requests or problems that are popping up in the work. The management group has given every manager in leadership position a task to go talk to their employees every single day and really listen to their worries. This is not so easy, if the managers commonly sit in their own offices working with their computers or running from meeting to another.

Gemba is a Japanese word that basically means going for a walk on the factory floor or office spaces to actually see and discuss what is going on and to build open and trusting relationships with the employees.

Employees seemed to be ok with management "going to the gemba". Now they had the change to tell managers what problems there were in the organisation and what was keeping them from doing their job. After discussing the problems and receiving encouragement and support from management the problems were easier to overcome. And if they couldn't be solved easily, they were able to delegate the problem solving to management. Many employees were truly happy that managers paid attention to their work. They felt proud to be able to share their work and the improvements they had finished to the management.

During the nine months research period I never witnessed anyone showing any poor attitudes towards the gemba walks. Actually what I observed was quite the opposite. Below is one example of my own gemba walks.

The logistics team is responsible for making shipment arrangements and creating the needed documents. It is also responsible for informing disptach about the schedule of the deliveries and providing them with the papers. Dispatch on the other hand is responsible for making the deliveries ready for collection and helping the drivers to load the machines and packages to the flatbeds or trucks.

Once I as the team leader of logistics team decided to personally take some last minutes documents to the dispatch area and I met there one of the dispatch employees. I had planned to just quickly drop the papers there, but instead I ended up having a great gemba experience. It took the gentleman about 30 seconds to deal with the papers I have brought and then he asked if he could show me around the dispatch area. He had specific areas for wooden packaging materials, tools, lifting equipment and a small office space. Everything was in great order and the floor was spotless. There was a great layout planned so that the items coming for packing came in from one side of the area and when ready they were moved to another door waiting for the truck.

He then asked if I had the time to visit also his other responsibility area, the end of the manufacturing lines for the heavy machines. We walked to the factory building and I could see he was excited to show the space to someone. The second area was just as well organised as the first one. I could tell he was proud of his accomplishments. I was proud of him. And I am sure that even Toyota managers would have been proud of the dispatch areas. By the end of the visit he modestly told that his only concern was that the trucks never came exactly according to the schedule, and that he sometimes had to wait for the trucks after his own working hours were done.

It was obvious that the person cared very much about his job and that he was excited about the 5S routine as he had managed to achieve major improvements in his working area. I am sure that the visit was very rewarding for both him and myself, as I felt motivated by it too.

Gemba is an excellent method for showing interest to people's work and to motivate people. It at best makes people feel appreciated, so they want to keep up the good work or even improve on that. The trouble for managers however is that they first of all need to find the time for the gemba walks in their busy schedules and on top of that they have to figure out how to deal with the problems they had learnt about during the gemba walks. So it was a lot of work for managers, and it was eventually not practised as much as it could have had.

So managers had created kanban-boards, they attended 10 minute morning meetings and occasionally they went for a gemba walk. This was a good start, but clearly not enough to get people engaged to the lean journey. Aren't kanban-boards, morning meetings and gemba walks closer to lean tools and techniques than really leading people. They had to take another look at their own lean roadmap and figure out what they could really do to improve on their leadership.

4.3 Lean leadership at Metso Minerals

Soon after the lean journey has started it became very clear that changing the organizational culture of a hundred-year-old company with old habits takes a lot more than good intention, planning and a series of lean tools. The change in the organisational culture would take years and could not be changed by management decision only. It would take excellent leadership to change the beliefs and attitudes of the people in the factory. The main challenge was to motivate people to change and accept lean philosophy and to help them overcome the fear of change. They would need to understand what was expected of them in the new organisation. The focus area in lean transformation for year 2015 was influencing people's behaviours and increasing the level of employees' engagement (Metso 2015a).

Figure 14 Metso Minerals lean transformation focus areas for 2015 (Metso 2015a)

Management board together with operational management had a meeting early in January of 2015 to discuss what the managers would change in their daily leadership to get every employee onboard the change.

Here is what operational managers promised to improve on their own leadership during 2015 and in the future (Metso 2015b).

More open communication:

- Initiating **conversation** more often with employees and using less emails
- Going to **gemba** walks more often and show interest in people's work
- Being present for own employees
- **Listening** to people
- Giving employees the opportunity to discuss also negative feelings without fear of being left out
- Reducing employees' fears

Setting goals:

- Demanding more efforts and following up on specific tasks
- Making lean roadmap visible to everybody and explaining what the specific steps mean
- Providing vision **why change was needed**

- Creating common principles how to measure changes achieved so far
- Creating **very clear and concrete targets** for every employee
- Providing insight on what role employees would have in the new lean organisation
- Showing the way forward
- Focusing on fewer improvement topics and ensuring that those would be executed properly and that the new habits would stick.

Creating positive working atmosphere:

- Building the mentality of "doing together" and getting everybody involved
- Leading **by example**
- Trying to move focus from an individual to teams and whole organisation
- Making job easier and nicer for everyone
- Being more positive in all situations
- Identifying the key persons that would support the successful lean transformation

Encouragement:

- Providing positive **feedback**
- Adding support and encouragement in every level
- **Empowering** people to solve problems themselves
- Using all of people's skills, knowledge and talents
- Acknowledging successes and really making them stand out
- Expressing being engaged ourselves
- Creating opportunities to succeed without fear or errors

Support:

- Participating in planning and supporting in execution of improvement processes
- Providing help whenever needed
- Active participating in team work or improvement processes

Enabling:

- Improving employee buy-in in every level
- Adding the amount of common practises and standard work
- Sharing best practises
- Raising **awareness and knowledge of lean principles**
- Securing flow of information
- Focusing on problem solving instead of pointing fingers
- **Providing time and resources** for improvement activities

The list includes many excellent ideas and the suggestions. The ones that are marked with bold are the ones that came up the most in the discussion. The attitudes towards change after this January meeting were excellent and the operational managers felt excited about starting their work with these issues. They would choose the tools best suited for their teams and get started.

Three months after this meeting was held, another management board session with the operational management was held and it was obvious that the moods had gone down. The head of factory asked what changes the managers had done in their leadership and what results had they achieved with the changes. Everyone was looking down on their hands and saying nothing. They felt they had failed and the overall feelings were very disappointed.

Operational managers had several explanations for the lack of improvement:

- Despite going for the gemba more often and talking with the employees, they had not been able to sell the need for change. There was still no need for urgency.
- Individuals might have done some improvements might nobody had the time celebrate those or to share best practices to others
- Lean coordinators had been named but they were focusing only on 5S which was not creating buy-in.
- The work was sometimes so chaotic that there wasn't time for improvements processes let alone follow up. All of the managers' time was consumed fire-fighting in daily issues.
- Most of the managers felt that they had been given a huge task without enabling them to focus on it. After all they still had all their old tasks consuming most of their normal workdays. They also had simply been informed about the lean journey, but no strategy sharing nor lean training had been provided. So how could they build engagement on their teams without having a clear vision themselves.

From this point on the management board took a more active approach in the lean transformation. They understood that the operational management itself needed more support, enabling and clear goals. Management board had to help operational management in their change process the same way as the operational management was expected to do with the employees.

They started by organising a lean training workshop for all operational managers. They also arranged a workshop were operational management had time to discuss and practise their leadership skills. They formulated a strategic vision which was then shared first to operational managers and together with operational managers to the entire workforce. The three-day lean training workshop was so eye-opening, that the same workshop was organised to first all office employees and most of the factory workers by the end of the research period. The training included for example the use of root cause problem solving tools. Operational managers were given a single goal to bring into annual development meetings, which was the need to start continuous learning and improvement.

4.3.1 Focus on people leadership

First of all managers were given guidance and basic principles to improve their leadership skills. The below guide shown in figure 15 was given to

managers. They would then make their own conclusions on how to move forward in improving their people leadership skills and methods.

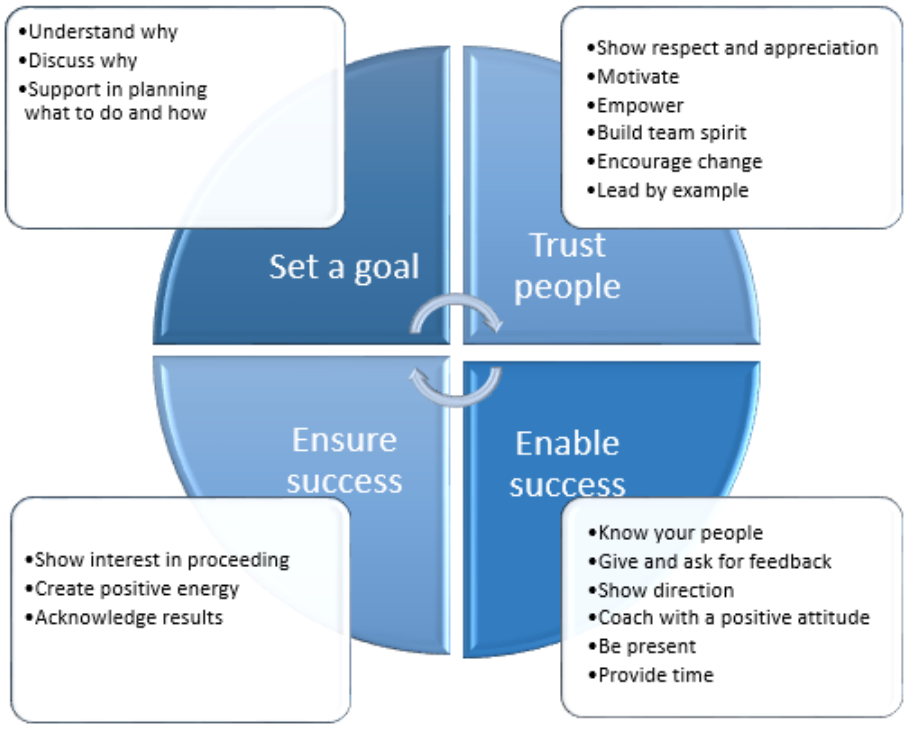

Figure 15 Basic leadership principles at Metso Minerals Tampere factory (Metso 2015c)

Managers soon noticed that the issues marked on the above figure were close to what they had first thought to do. They only needed encouragement and reassurance that by working on these goals they would be able to change people's behaviours. It would only take a lot of time. These principles were not concrete action steps easily followed, but instead they had to be incorporated into their every action. Clearly they needed to take a big step out of their comfort zones. However, lean is about incremental changes and small improvements and eventually the operational managers understood too, that changing their own and their employees behaviours could be done by taking only small baby steps.

As the first attempt of changing leadership routines had not worked, in the next meeting the operational managers were asked, what was their motivation to start changing their leadership. Here are the answers given in the board meeting.

- Creating open atmosphere and trust makes working easier.
- Improve wellbeing at work by showing employees that they and their skills were appreciated.
- Being present and open for discussion makes it a lot easier to find out what is going on.
- It is allowed to have fun at work even with managers.

- Educate and empower people so they can make independent choices and solve problems themselves, which also helps cut some of the managers' workload.
- People want to be proud of the work and managers want to be proud of their employees. Give them a change to succeed and build motivation at the same time.
- Managers can only be as successful through the success of their employees. Make sure the employees use all of their potential to reach best results.
- Manager can't force changes in attitudes by forcing and demanding. Succeeding in changing people's behaviour comes from being a positive example, working together, encouragement and acknowledging good results.

4.3.2 Strategy sharing - picturing True North

The next step was to create and share a vision of the factory's True North to everyone. The True North, which in the factory was called North Star, was discussed with the teams in an informal get-together.

In the book Toyota Way Liker (2003) states that there are 3 different types of leadership. The first is a traditional hierarchial method, where managers tell employees what they have to do. Another is a laissez faire method, where managers let employees do what they want or what they think is best. The Toyota way is somewhere in between. It discusses the best work processes with employees and supports the employees to reach best results.

This is what Metso managers are trying to achieve as well. The management board first introduced a vision of Metso's new North Star to the operational managers and gave them a change to figure out what they thought it meant. Metso's North Star was not a power-point-presentation, not a story, not a list of goals or financial targets. Instead it was one single picture of several people in Metso's work uniforms rowing a boat on a river and fishing. Next the vision was discussed on groups where everybody were able to share their opinions and then discuss what each individual could do to take the team closer to the North Star. Similar strategy sharing workshop introducing the illustration was later held for every team in Metso Minerals Tampere factory.

Metso's North Star is very figurative. Employees pointed our very different aspects of the image. Some noticed the leader who is showing the way from between to rocks to better fishing water. Some noticed that the employees had several different tools to attract the fish, meaning customers. Safety was also noticed. The successful journey was being supported by external viewer, who might be a potential employee, supplier or other business partner. While Metso's boat is attracting all the fish, the competitor is left with nothing. It was also noticed that people in the image were working together and having fun while doing it.

The vision might not be very concrete and certainly not easily achieved. But every employee was involved in figuring out what the factory's vision was. And they had loads of fun analysing the picture. After the picture was shared in discussed in teams, nobody was left with any confusion about where the company wanted to be. They could later in teams decide, what work processes they could improve to bring the company closer to the vision.

Next step was to turn this vision into more concrete targets for employees, and that meant the implementation of kaizen and creating positive attitudes towards continuous improvement.

4.3.3 Metso Minerals guide to continuous improvement

Imai wrote that one of the biggest obstacles of implementing kaizen into US companies is selling the idea to top management. Western leaders often connect continuous improvement with innovation and research and development, which both cost a lot of money. Kaizen is different as it is about small, incremental and constant improvement steps that make the best use of the resources at hand without using money. (Imai 1990, 44).

For Metso Minerals Tampere factory the concept of kaizen is suitable exactly because it doesn't burden the already weak financial situation. There it is actually management that has to sell the concept to the employees.

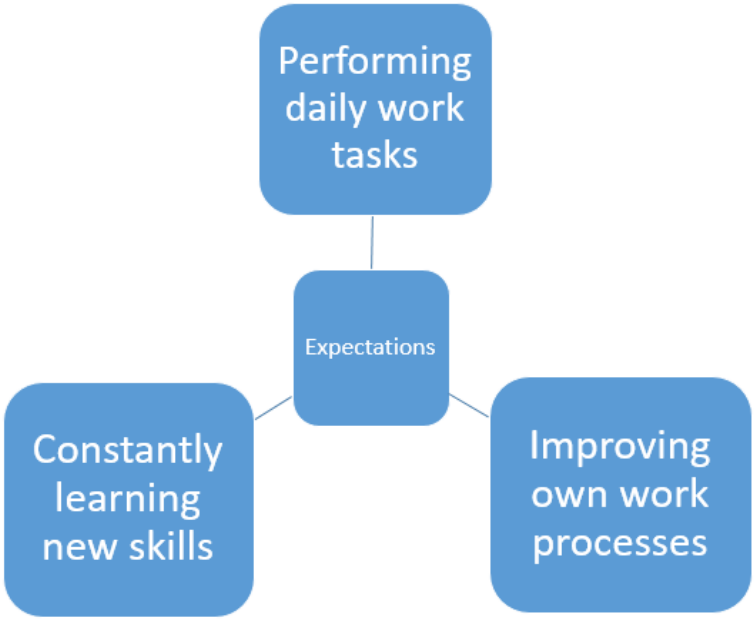

Figure 16 New expectations for employees in lean organisation (Metso 2015c)

The managers at Metso assumed it would not be easy to sell the concept of kaizen to the employees, as suddenly they were expected to do all sorts of improvement activities on top of their current work. So the managers had to be very well prepared for selling kaizen to employees. Managers held

their own one day workshop, where they only practised having annual development discussions and expressing the new expectations to the employees. Opponents in the workshop were advised to come up with as many arguments against change as they cold possible think of. As a result the management group was equipped with many counter-arguments and reasons supporting the lean change and we were ready to have these meetings with employees.

To a big surprise or almost all managers the employees had a very positive response to this idea. In fact almost everybody said that they were in fact already working like this, learning new things and improving the processes as they were doing the job. Nobody just had asked them about it before. Apparently the strategy sharing and the lean training workshops had set their minds into right tune to accept changes. Now it was time to start sharing the improved processes and individual learning in teams to ensure that these improvements would stick.

After all the employee engagement efforts, sharing a vision, educating people and telling people what they were expected to do, management got the first signals, that people were starting to accept the change and changing their behaviours. This was an excellent position to move forward in the factory's lean journey.

4.4 Lean transformation journey at Metso Minerals Tampere factory

In the beginning of the empirical research I witnessed the rather poor attitudes people had towards lean. They had been forced to implement several lean tools, but they hadn't been given information on lean in general or what changes it would cause in the organization. People were left with unanswered questions and with some fears. They tried to do what they were told to, but didn't really see how it would help the company r their own work. As a results people's motivation and engagement as well as their productivity – that usually are linear – went don't from the start of Metso's lean transformation. In the beginning of the empirical study the the factory's efficiency and employees' motivation and engagement were at point 1 of figure 17.

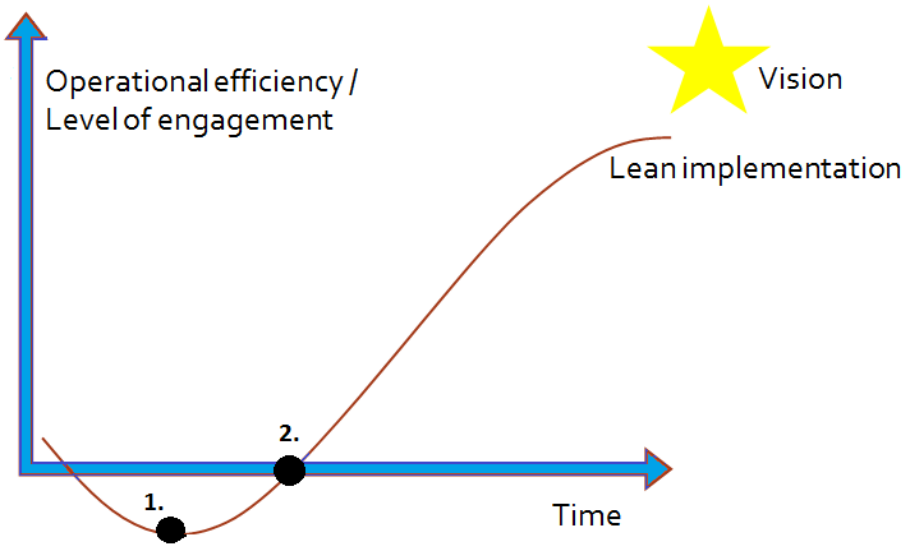

Figure 17 Employee's engagement and company's productivity in different phases of the empirical study.

The managers at Metso Minerals Tampere factory then took a benchmarking visit to Volvo Sweden, where lean transformation had been successful. In Volvo plant all employees were happy to say that lean was great, the visual management boards made everything more fluent and in general employees trusted lean philosophy and were highly motivated and engaged. Yet they told that in the beginning it had been chaotic and people had definitely not wanted to accept this organizational change. They had achieved the great results of lean only after the employees were educated about lean enough and given all the possible information about where this lean journey would take Volvo Sweden.

This gave also Metso managers trust that despite of poor results in the beginning they could turn the lean transformation of Metso Minerals Tampere factory as success also. After this the management started to organize strategy sharing sessions, arranging lean trainings and simply being more active in discussing lean with their employees. During the nine months of empirical study the lean learning curve moved to point 2 in the figure 17.

4.5 Conclusions of the empirical study

The empirical research in the study ended at this point with a positive setting. The empirical study still pointed out problems in the company.

In the team of logistics and invoicing the kanban-board was not used for maximized benefit. Also the workload was often chaotic and it needed to be balanced before any other improvement steps or lean tools could be implemented. The next chapter focuses on creating an improved model of the kanban-board and creating a plan for using lean methods to stabilize the chaotic workload in the office.

The empirical study also showed that operational managers needed guidance to build motivation and engagement. Sixth chapter of the thesis evaluates the leadership guidance given to the operational managers in compared to the findings of the theoretical study.

5 LEAN SOLUTIONS FOR OFFICE ENVIRONMENT

5.1 Identifying improvement objects

According to Womack and Jones a lean office must in the first place understand what actions create value to the customer and then putting the steps in a tight sequence to improve flow. According to this the first thing in the office to do is define, what processes there are.

The logistics and invoicing team's processes include:

- Shipment preparations for the heavy equipment ordered by customer: clarifying manufacturing and delivery schedule, finding dimensions, clarifying delivery port, asking for quotes, making the bookings to domestic transportation and for the sea transportation and then creating shipment documents
- Creating customer invoices
- Making shipment preparations for back orders as well
- Asking for transportation quotes to support sales activities, where there is still no exact knowledge of the product (dimensions), schedule or delivery location.
- Constantly monitoring own transportation pricing and market prices and negotiating best possible prices for our deliveries
- Learning to utilize SAP better to maximise its potential
- Meetings with the transportation partners and team meetings

The observer can easily see, that this is not a single process, but actually several processes that flow simultaneously and at different speed. All of the processes include several steps that in some processes flow better than others.

For example creating an invoice mainly requires one person with the skills to create an invoice in SAP. In addition she or he has to send the invoice to the customer, shipping company and customs as well as mark the order as invoiced in the kanban-board and in a monitoring excel. This process can be done by a single person without having to ask for information from other parties. Not all the steps are necessarily performed at once with continuous flow, but people tend to create the invoices when needed and then share the information in the follow-up excel only once a week.

Preparing the shipment is a lot longer process that requires a lot of input from other people. It includes numerous different steps and in between a lot of waiting around. The logistic coordinator can hardly affect the speed in which she receives the input from the other people, but she can ensure that the process flows forward whenever she receives this input. This is the logistics coordinators most important tasks, and when she focuses on the shipping preparation process, all the other processes are stopped for a while.

For finding out what steps actually create customer value and what are the reasons why a certain process doesn't flow, I suggest that the team would next focus on value stream mapping. Value stream mapping is another

lean tool that helps to identify the steps that are non-value adding or that stop the flow. The lean champion at Metso Minerals Tampere factory said that value stream mapping is very heavy tool and he assumed it would be too much for employees to adopt at this point of the factory's lean journey. I don't quite agree. I would suggest the teams are trained to tackle value stream mapping. Then I would like to see the teams identifying and mapping their own work steps in an informal workshop, using for example post-it-notes to identify whatever steps come to their mind and then putting them in the right order. It don't have to be perfectly correct, but give the team members an image of what flows well in the process and what are the steps that cause the processes to stop. Only after these steps are identified, can the team focus on solving these problems and improving the processes.

Continuous improvement – kaizen – makes a lot more sense when the improvement objects are clearly identified. That way the improvement activities can be directed to those activities that benefit customer the most.

As long as the team hasn't found the time to do value stream mapping, they can produce ideas for improvement by themselves based on their experience. Mann (2015, 271) showed an excellent idea, that could be implemented too in Metso Order office. It is an idea board for continuous improvement processes, where the improvement ideas flow from ideas to done.

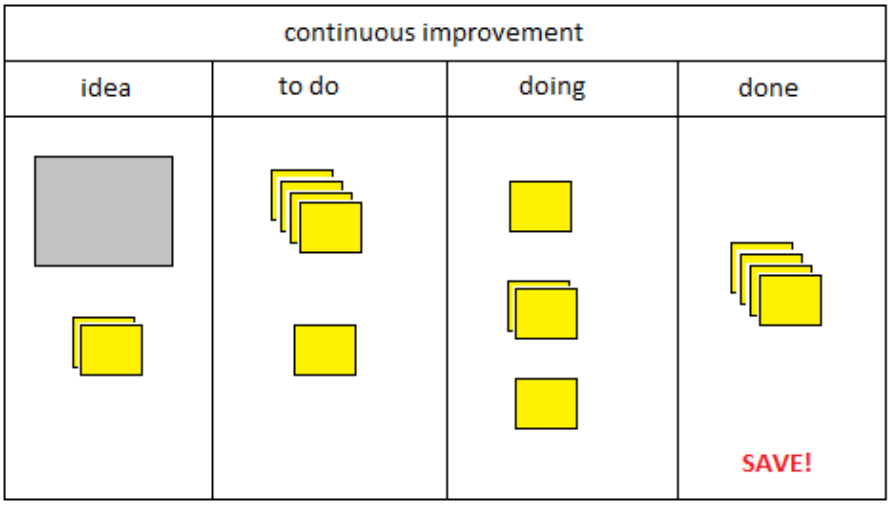

Figure 18 Suggestion for continuous improvement idea-board

I suggest that this kind of table in the kanban-board would also be taken into use and that the ideas would be discussed and started on every now and then, if not in morning meetings but at least every week.

5.2 Improving flow

Lean tools can at best help improve flow of the processes significantly. So far, until the end of empirical research period, only a few lean tools have been implemented in the Metso Minerals Tampere Order. These included

5S, kanban-board, morning meetings, gemba and the concept of continuous improvement and problem solving tools.

Torkkola (2015) stated that before any improvement activities can take place – or flow can be improved – the chaotic workload must be stabilized. This can be done for example decreasing the amount of interruptions, having defined prioritizing rules, increasing level of focus using 5S method, making better use of kanban-board and introducing another lean tool: heijunka. Everyone should always remember to start less and finish more.

5.2.1 Problem with 5S in the office

The first lean tool implemented into the office environment was 5S. Why? Because 5S improves safety and safety is the number one priority in the manufacturing company. Despite of this the attitudes towards 5S were quite poor in the office. After all you can't reason using 5S with improved safety, when there aren't any safety problems in the office space. If there are zero safety hazards in the office before 5S, and also zero problems after the implementation of 5S, then what would have been gained by the 5S implementation? The benefit of 5S in the office is not in safety but in other areas, but people didn't think the cluttered desks would affect their working efficiency in any way.

Employees were willing to say that 5S would benefit them in making the work easier and the working environment nicer. They thought that by decluttering their desks, their emails and their calendars, it would be easier to focus on the important things. However, it took too much effort to make the changes or find time for organising, so the office 5S was not completed. Many employees saw it being just frustrating. The things they had already organised according to 5S rules, had simply not changed anything in their daily work. Instead it had only consumed their time, which they didn't have enough of.

Implementing 5S should not be difficult but it would require a change in behaviour. Based on the research I think the tool itself is suitable also to the office environment, but it requires effort in creating employee buy-in as well as building motivation to accept 5S as a part of their everyday work. This is discussed more in the next chapter.

5.2.2 Maximizing use of the kanban-board

The main targets of using kanban-board is visualizing the process flow and visualizing the workload of the team. Although everyone in the team are satisfied with the current kanban-board, it is not yet used for it's maximal potential. In the current kanban-board of the Order office there are a few shortcomings:

- the flow stops in the middle of the board

- the board does not show the shipping preparations until the shipments and invoices are actually handled and the work is in fact done. The kanban-board needs to show work-in-process too.
- Office employees also receive many requests and have other tasks that are not related to actual customer orders. Those are not shown in the board because people simply are not writing them down to the other issues section. People prefer to prioritize and handle those requests themselves without having to discuss this in the morning meetings infront of the kanban-board. The total workload of the team is thus not shown.
- Kanban-board also doesn't show the workload of a single employee.

I would suggest that all of the team's processes are added to the board and that also the employee names are added there, so that anyone can see exactly what each employee is working on.

This will benefit first of all the team members as they now have a clear work list with priorities and they know these processes are the exact ones they should be working on that day. The goal is that employees can focus on the tasks listed in their own WIP-section of the board. When new requests come in, those are added to a not yet started –section of the board. If they have extra time those can be handled, but they should not let any new requests stop what they are currently doing.

Many of the new requests come to a common order.office mail address. The mails coming to this common mail address however are not in a separate mailbox but all of those requests come to each person's own inbox. Employees are used to reading all of those emails and deleting the ones that are not their responsibility. Only the ones that need action are left to the inbox of one person, and other then don't have any visibility of that request, or the possibility to evaluate the workload of a single person. I would suggest that there was a new common mailbox for these mails. When a request came in, people would only move the request to their own inbox when they were ready to start working on it. Of course if an email was related to a process that someone was already working on, the mail could be moved to a private email right away. So the common mailbox would in fact include only the requests, that no-one is yet working on. At the same time individual inboxes would only include emails that were related to work-in-process. If a mail got stuck in the common mailbox for too long, the team could easily see that something was stopping the flow. Was no-one responsible? Didn't anyone have the time? Did finishing the request take skills that nobody had?

Other requests come to employees own inboxes. Employees might also receive the requests by phone or from a meeting they have during the day. Visitors from other departments, often sales support, will also come to the single employees telling them about a problem that needs to be handled.

There is one more source where work tasks from and it is the open order base. That is in fact requests coming from ERP. All of these requests must be visible somewhere as work-not-started until it is actually started.

Torkkola (2015, 47) suggests, and this is also in use by single persons, mainly board members, in Metso Minerals Tampere factory, using yellow post-it-notes to show the requests in the kanban-board. Those notes can easily piled according to priority, the notes can be also easily moved from not-yet-started part of the board to work-in-process –section. Requests coming to the common mailbox as well as mails coming to individuals directly could be written in post-it-notes and then added to the kanban-board not-yet-started.

At this point the request is not yet allocated to any single person. Each person's workload could be evaluated based on the number of the post-it-notes on the work-in-process section. To even the workload the requests would then be moved to chosen employee. The notes would be arranged according to priority and on top would always be the process the employee was then working on.

Here is one suggestion for the new improved kanban-board. The changes are done for the part of logistics and invoicing team's part only, to make illustration easier to read. However the same changes could be done to the order handling team sharing the kanban-board.

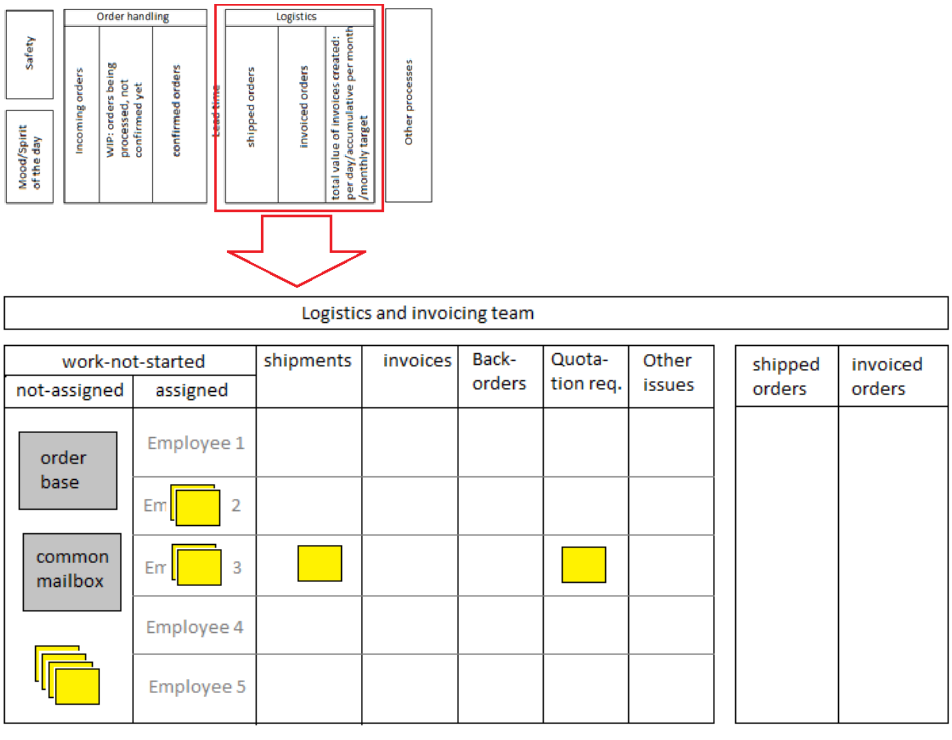

Figure 19 Suggestion for an improved kanban-board

In the suggested improved kanban-board the work not yet started is clearly shown. It is from that point prioritized and assigned to employees, but at that point the employees can keep the work in not started but assigned section of the board. Then come the most important and common

practises. If the team want, they can even divide these sections to smaller parts, for example the shipment part can show separate columns like transportation booking or creating documents. It is important to be able to tell, that a single persons pile of post-it-notes doesn't grow too big. That is the only way to know that nobody is being overloaded and the workload can be stabilized and allocated evenly to different employees. Also this gives the employees the change to focus on the ones already started. They should not take on too many new tasks until they have been able to finish some of the old ones.

In this suggestion also the shipped orders and invoiced orders are shown, because that is the information that external viewers are mainly interested about and that information needs to be shared to the factory's management. For the lack of space the illustration does not show the value of the invoices, accumulated value or the monthly target, but it is an important part of the current kanban-board and should remain visible there.

5.2.3 Heijunka

With the use of the improved kanban-board it is a lot easier to start using also another lean tool, called heijunka. It is an effective method to even and stabilize workload, but it can only be used if the entire workload is known. According to Mann (2015, 338) heijunka was originally used to level out work in the production, but it can also be used in office work.

Using heijunka requires that for every process there is an estimation of how long it takes to complete the task. In production you would also use a long time average to estimate how many units the customers need. But in the office estimating the incoming requests, their type and how many per day will come, is very difficult. So it is better to do the workload levelling based on the requests that are already known. Everybody can estimate on their own how long it takes to complete a certain process, precisely how long it handling his or her share of the process will take.

For example getting a simple transportation quote from a transportation company might easily take two days, but the logistics coordinator needs to first just gather the information that is needed to send the quotation requests to the transportation company and after the quote is received it is send to sales contact or customer. The logistics coordinators part will probably take an hour instead of two days. So handling this type of request will take an hour of the logistics coordinators type, not two days.

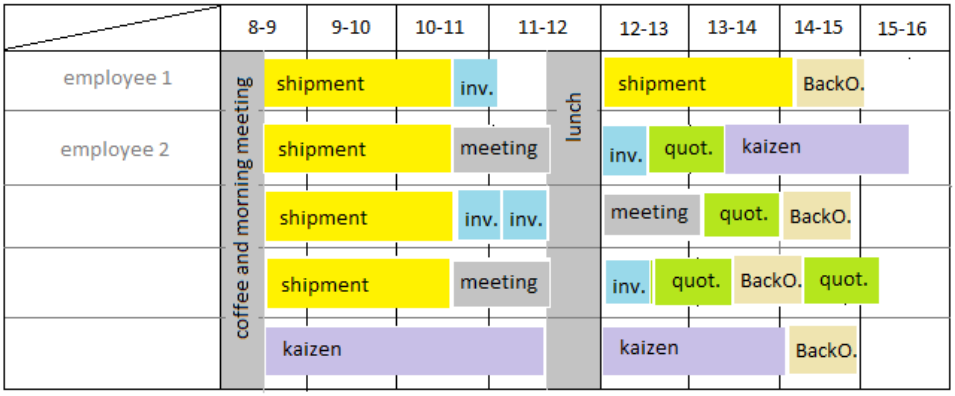

Figure 20 Example of Heijunka workload levelling

Here is an example how the work could be for example levelled. There can be one machine delivery for every person in the day per person, but as one of them might be involved in a continuous improvement activity, someone then some other team member can take care of the additional shipment. Also if there is approximately five machine deliveries a day, then there will also be as many invoices, although they might not be for those same machines. Every persons time table had some unplanned time, because there is always interruptions, phone calls, reading emails and so on, that will stretch the schedule. Also it is a good time for open discussion.

Many of the processes include a lot of waiting and the employees can't finish a shipment in just a couple of hours. Instead they work on a single shipment a little bit, maybe then focus in proceeding with yesterday's bookings and create papers for finished machines having been started earlier. Including all the steps handling the shipment will take all together 2 hours and so a two-hour-slot is marked as reserved in the table. The table will show how many processes the employees can start in a day, even if they actually have a lot more processes ongoing simultaneously.

6 MOTIVATION AND ENGAGEMENT

6.1 Analysis of the motivation and engagement in the office

The empirical research of the thesis shows that employees did listen when management decided that lean transformation was necessary. Apart from some employees that showed enthusiasm and adopted at least 5S soon, most of the employees took more convincing and only took some steps towards improving their work environment according to 5S principles. They did what they were told, but only when they were told and not necessarily with the best attitudes or feeling motivated.

It was like the motivational theories say, that today you can't motivate people by controlling and commanding but you need to influence their thinking and emotions.

Also during the observation period it looked like people had in fact quite positive attitudes towards lean. They didn't have any special concerns and they were willing to accept that lean might help them improve the company's efficiency. However, mostly nobody was willing to make any changes to their daily work to support lean transformation. They made a little effort but nothing that would require them to step outside of their comfort zones. During the empirical research it became clear that people needed to be motivated, so they would be willing to take action voluntarily.

The theories also said that engagement relates to willingness to learn, self-development, initiative and improvement activities as well as behaving according to organisational norms. All of these issues are required in a lean organisation, so it can be concluded that lean transformation is not possible without engaged employees. Thus, it is crucially important on improve the level of employees motivation and engagement.

The basic principles of building employee buy-in, motivating and engagement all state that people must understand why is change necessary, what are expected from them, what are the expected results of a certain action or in this case behaviour. Early involvement in the change process as well as being properly educated both the new methods and their expected outcomes are key prerequisites of building employee buy-in.

In Metso Minerals Tampere factory the lean transformation started with the implementation of 5S. There weren't lean trainings, strategy sharings or explanations why 5S was suddenly so important. Employees weren't involved from the start so didn't have the chance to discuss lean transformation properly until the transformation had already started.

Only after the three-day-long lean training and the workshops for sharing the factory's vision, employees' levels of enthusiasm was clearly increased. In my observation I noticed that people started to show more positive attitudes, they asked more questions proving they were interested in lean in open for encouragement. This was now is million dollar

opportunity and all the leaders at Metso should take advantage of it. They could not let employees lose their enthusiasm, their momentum, but try to nourish and grow it. This was more important than the constant fire-fighting that was consuming the managers' days.

6.2 Concrete action steps to motivate people and improve engagement levels

All of the ideas that the operational managers had suggested in the management board meeting are good examples how they can improve employees motivation. Also the nine minutes on a Monday routine in my opinion works very well.

In my team of logistics professionals I want to take these simple actions everyday or at least weekly to increase employees' engagement.

- I want to make people feel cared for by discussing with them each day how are they or their family doing. If a person is into sport, interior design or for example expecting a baby, I want them to feel free to discuss those with me as well. I genuinely want show I am interested in them and in their lives. Luckily there are only 5 people so I truly have a change to do this. In my opinion this improves openness and good relationships at work, which in turn make it easier to have fun in the office. Work doesn't have to be so serious all the time.
- I want to pay more attention on recognizing good work. A morning meeting is an excellent opportunity to provide positive feedback and acknowledgement to a single employee and infront of everyone. I would also like to try giving employees hand written notes with positive feedback about a work well done. I will need to make myself a routine that reminds me to provide this positive feedback even if my schedule is busy and I am running from meeting to another and thus not being present in the team space.
- I also need to give people the opportunity to grow their skills. Many of my employees seem to think that the only way to learn new skills is through official and often expensive training, which are in many cases not possible to organise. But at our workplace there is plenty of online training material. Youtube and google are filled with training material. Someone from the organisation with the specific skill can come help my team member. The training does not have to take a lot of time, effort or money. Also learning by doing is a good way to learn, it is actually the lean way. I want my team members to be able to tell me when they are interested in growing their skills and together we could find the time to do it.
- I want to be a leader who supports, encourages and discusses the processes. I want to be clear with the targets for each individual employee, but I don't want to tell anyone exactly how to achieve a goal. The professional are themselves the experts and thus they can achieve the best results by figuring out the methods themselves. I will provide them with support and give them the opportunity to really focus on the job at hand. I think I can start

with a simple "how can I help". Also the implementation of the idea board and the improved kanban-board can be used as visual signs that there is a timeslot reserved for this learning and that the employee is then allowed to focus only on that.

- I also want to start less and finish more. This means that can't give my employees any promises if I don't have the time to complete something. Any problems in the team will need to be grasped immediately without any procrastination. I want them to know, that they can trust me in all situations. I will learn to delegate more, which should also show that I trust my employees skills and knowledge to finish tasks that they might not have the courage to do at the first place.
- In my team the results are often linked also to the performance of other teams. Our KPI's include for example on-time-deliveries and monthly invoices. We can only reach our targets in these areas if the production is able to finish in time. So showing interest also to production employees and giving them positive feedback on their performance might help improve their level of engagement and thus their performance levels as well.
- I want to work with positive attitude and show good example of working with enthusiasm, even in the days I don't actually feel it.

Although I have planned these concrete actions for my own use and in my own team, I still think that any leader could use some of these easy steps to improve their employees' motivation and engagement.

6.3 Getting employees involved

As Conant (2012) said the employees will only be personally engaged if they genuinely believe that the company is engaged in making their lives better. All of the lean tools are making the work of an employee flow better, improve their focus, levelling the workload or doing something else that make the work nicer and employees more productive. In the end these benefit the company. The motivation and engagement suggestions above also are about the leaders making an effort to make working nicer for the employees. However all of these are ideas from the management, but I would like to see employees involved in telling the company how exactly would they improve the work environment and how can the company help make their lives, or at least worklife, better.

I suggest that people start adding also work environment and wellbeing at work related improvement ideas to the idea board. The ideas will be then discussed and the idea that the team finds to best or most fun, will be executed. Management is not allowed to vote here, but this idea is only for the employees. The rules for the idea are following:

- Each of the ideas must come with a execution plan.
- Each of these ideas may have a cost of two hundred euros.
- The idea must benefit the whole team, not just some individuals.
- The benefit of the idea should be continuous, not just a onetime deal.
- The time consumption of the idea should be realistic.

- All the ideas are discussed each month and the best one is executed. The ideas that don't receive much support are dropped. The ones that people find to be excellent but not the best, maybe listed again next month.

The ideas can be for example buying a coach to common spaces, buying a bright light lamp for people to use in turns or buying an espresso machine if people like to drink better coffee. It can be a team walk in the nearby park in the middle of the workday once a month. This doesn't consume money but instead time, but at the same time improves team spirit and the exercise and outdoors might also improve employees' efficiency for the rest of the day. Whatever the suggestion is, if the whole team likes it, it will be executed.

This idea came to me from remembering that in the recent years I have browsed the internet and read old magazine articles about the processes of companies that have succeeded in the great place to work competition. I also have had informal discussions with family and friends working in such companies in the recent years. They all emphasize the involvement of individuals in improving the workplace and making it more fun for them. In these workplaces people are highly motivated and willing to make extra effort for the company. The idea like suggested above is coming from one of companies succeeding in great place to work competition.

The great place to work institute has listed the benefits of such company. People trust the leaders of the company and they are proud of their work and the company. Also people enjoy working there and with their colleagues and want to do their best ever day. People work together as a team in an environment filled with trust, which results in the organisation achieving it's goals. (Great Place to Work n.d.).

7 CONCLUSIONS

First goal of this research was to find the right lean tools to be used in the logistics and invoicing team in the office environment. The second goal was to help managers identify methods that would help them build motivation and engagement so their employees would accept the lean culture and start behaving accordingly. This chapter summarizes the findings of the research.

7.1 Summary of the suggestions for lean tools in the office

7.1.1 Most suitable lean toolsfor the office

Currently the team is using 5S because it sends a message that work safety is the factory's main priority. It has been implemented but only to visible workspaces and not used to organize information on computers or mailboxes. However extending to usage of 5S to computers and the digital materials requires a shift in people's attitudes first, so I suggest that it should not be the main focus area in the office team at first phase.

As stated earlier in the research the Kanban-board is an excellent tool in the office and already being used, but it is not used to it's full potential and needs improvement.

The first research question was to find out what lean tools would work best in the office team. The research suggests that value stream mapping, active kaizen activities and improved version of kanban-board would be implemented immediately. In the second phase when people have accepted lean methodology the team could continue working with lean 5S and start using heijunka as method to even out workload in the team.

The first lean principle by Womack and Jones is identifying what brings value to the customer. The second is identifying all the steps in the process and putting them in a tight sequence to create flow in the process. This can be done using a lean tool value stream mapping. I want my team to map their own value streams in their own way so they learn how to look for improvement objects.

Once this value stream mapping is done, the improvement objects are more easily identified. I would add all the improvement objects identified to an idea board, as well as other improvement ideas the employees might come up with. The ideas would be discussed in morning meetings and the working with single ideas would be started according to workload situation. This I think would improve the culture of continuous improvement.

I would proceed with 5S in the office only later when people are starting to see that lean works. Right now people are working on it because they are told to and not because they want to. In my own team I would let the idea rest first and tackle it later.

Kanban board I think needs immediate improvement that benefits both the employees and the team leader. The kanban board needs to show work-in-process to estimate how levelled the workload is and how much new processes can be started.

Heijunka helps level the workload too, but I think it is important to see how the improved kanban-board works first. Heijunka would only be the next step if people still feel like there is too much work.

7.1.2 How to improve flow in the office

The office work is highly variable. The workload varies per day and per person and most of work processes require input from several persons. There is a lot of waiting because the office professionals cannot finish all work processes by themselves and also because there are many tasks waiting to be started while the employees are working on something else.

The main obstacles to flow in the office work come from the unevenness of incoming work requests and the time it takes to wait for input from other parties.

I think mapping the work processes into single steps and making sure that the employees handle those steps quickly – even if the whole process still takes the same amount of time – is needed to create a sence of flow. The team can only affect the flow of their own work and not the flow of others, so the focus must be on single steps rather than whole workprocesses. Value stream mapping is an excellent tool to identify these steps.

When these steps are added to kanban-board, making it even more detailed, it will clearly show how the steps flow.

Heijunka also will make sure that the workload is levelled, which makes it easier for single employees to focus on what they are currently doing and really finishing work steps instead of having several as work-in-process. This minimizes the overall time spent on waiting. It also makes prioritizing easier, so that most important tasks are done first, making them flow as good as possible, and only then focusing on other tasks, that are not so crucial for the overall flow of the factory.

Currently the Kanban-board is not showing work-in-process so it doesn’t improve flow as well as it could. Also focusing on lean 5S is not making any noticeable impact on flow, although it might save some time in term of finding right papers or reference materials.

7.2 Summary of the motivation and the engagement techniques

7.2.1 Observed attitudes and behaviours on the factory's lean journey

The empirical research showed that in the beginning of the factory's lean journey people were not very motivated because they didn't understand lean and didn't know why they were asked to adopt the first lean tools. Several lean tools were implemented without lean trainings, strategy or vision sharing or adequate explanations why the managers wanted to intake lean. In the beginning of the empirical research people's motivation and engagement levels were obviously low and people felt negative or indifferent about lean.

During the nine months of observations the levels of motivation and engagement improved considerably after managers took more active approach in sharing their vision and knowledge with employees. The emerging enthusiasm was still delicate and fragile. It would take excellent leadership to take this emerging enthusiasm and grow it into motivation and engagement.

7.2.2 Improved management methods identified at the factory

Lämsä and Hautala (2004, 80) said that the employees need to motivated through influencing their thinking and emotions, not by controlling or commanding. Influencing the emotions and giving people the opportunity to think things through themselves will drive them to want to make an effort.

Conant (2012) stated that the employees will only be personally engaged if they genuinely believe that the company is engaged in making their lives better.

The factory's management group together with all operational managers found these methods to work best in motivating and engaging the employees:

- open conversation
- going to the gemba
- Listening to people
- explaining why and what role employees would have in the lean organization in the future
- giving clear and concrete targets
- leading by example – accepting and using lean tools and showing lean behaviours
- Providing positive feedback and acknowledging good results
- empowering people and providing them with needed resources
- educating people on lean

7.2.3 Concrete motivation and engagement methods for office managers

In my opinion this means that the leaders will need to focus on the emotions of people and creating a trusting and fun work environment and providing them lots of positive feedback and encouragement. A leader must shift the focus from hard management facts to softer leadership techniques. Most of all they need to give the employees a sense of involvement and appreciation.

This should be easy but finding the time to take the required small actions every day is more difficult than it appears. It requires changing the what has been done earlier and stepping outside of the manager's comfort zone. So I planned a short checklist that the manager can look every day to remind oneself of the necessity of these small steps. The checklist is a short version of the results shown in previous chapter.

Figure 21 Manager's checklist for improving motivation and engagement.

8 EVALUATION AND CONTRIBUTION OF THE STUDY

There are numerous approaches to lean management in literature. From the beginning I chose to put the emphasis for the respect of people. This was a matter of opinion and choice, and I felt this was what would work best in my team. Another researcher might have placed focus on system efficiency or another dimension of lean. Then the results of the thesis might have been very different. The respect for employees focus however works for me and is closer to my values and therefore the suggestions are easier for me to execute.

The research process itself has been extremely challenging mainly because of time consumption. I wanted to gain information on lean and people leadership in a quite wide range to learn what tools and approaches would work best in my workplace. I would estimate that because there is so much literature and also so many aspects of both lean and people leadership, I wasn't able to study particular lean tools or specific methods for motivation and engagement very deeply in the theoretical framework of the study. However, this wider perspective allowed me to consider different solutions that might work in my workplace, which I think eventually lead to a better end-result. It also meant that building the theoretical framework for the study took a lot of effort and time.

The empirical research was just as challenging, because I had to do all of my observation and discussion during working hours in between my normal work. In many cases I wanted to go ahead with many of the ideas found in literature, but I simply wasn't able to find time for it very soon in my team. Same happened when a new idea was presented in the management board meeting, which I would have liked to communicate to my team and then observe their reactions, but I couldn't do this in a different timeframe then other operational managers. I was still able to observe people's attitudes in the beginning of lean journey, when they started to realize what was expected of them, and also when they showed first signals that they might be coming onboard the lean journey. It resulted in numerous notes that I had written down in a hurry and eventually draw conclusions from them when I wrote down the empirical part of this thesis.

I could have chosen a qualitative method for studying employees' motivation and engagement. I chose however another approach which was informal discussion and observation. Because I know my employees I believe I got a better perspective this way. I believe that if I had used a formal qualitative questionnaire I would have gotten answers that employees expected me to want to hear, rather than what they really thought.

I am satisfied with the results of the thesis. The theoretical study support especially the results related to the lean tools and I believe that those changed can be rather easily adopted into my working environment.

The literature on how to motivate and engage people as well as the management groups ideas observed in the empirical study suggest that managers should focus on softer values in their leadership. As results of the study there are some suggestions how to motivate people and improve their level of engagement. These are the first steps that I think will work best in my team and the ones I will try first. I am happy that lean is about experiment and observation, because there is no guarantee that the suggestions will have the expected outcomes. Employees' emotions are influences by their old experiences and beliefs as well as their previously learned habits, so people must be given time and a reason to change their beliefs and habits first. I am prepared to spend a lot of time on this and only after that evaluate how well the suggestions worked.

During the research of the literature and observation in my workplace I have come to understand that one size definitely does not fit all. The suggestions of this research are planned for the office team where I work as a team leader. Leaders must understand the differences of employees, teams and work environments, to be able to choose the best lean tools and leadership techniques in their situation. However continuous learning, learning through experiment and evaluation, is at the very heart of lean management. It is about making small incremental changes that all take you a little closer to the True North of the company.

Lean management is a popular management method to improve a company's productivity and lean transformation is the biggest leadership challenge also in my workplace now. Lean transformation requires understanding of the basic of change management as well as motivating and engaging people. Lean transformation changes the organisational culture and that requires changing employees' behaviour and thus their level of motivation and engagement. This research serves the purposes of any leader in my workplace and other companies that are working on lean transformation.

I wish other managers in Metso share my views or are willing to try these tools and techniques presented in the study. Also I feel the basic principles for motivating and engaging employees presented in this research are valid on any organisation.

The suggestions in this study have not yet been presented to the management board of my workplace. The suggestion will measure also their level of commitment to the change, since in a traditional organisation they are accustomed to hierarchial top-down-management approach. Involving employees in a change process from the start is not a very familiar to most of the managers in my workplace.

SOURCES

Bakker, A. (2010) Engagement and "Job Crafting": Engaged Employees Create Their Own Great Place to Work. Retrieved 25.11.2016 from https://www.researchgate.net/publication/286982306_Engagement_and_job_crafting_Eng aged_employees_create_their_own_great_place_to_work.

Bakker, A., Albrecht, S. & Leiter, M. (2011) Key Questions regarding Work Engagement. *European Journal of Work and Prganizational Psychology*, 20 (1), 4 – 28.

Bell, S. And Orzen, M. (2010). *Lean IT: Enabling and Sustaining Your Lean Transformation.* New York: Productivity Press.

BusinessKnowledgeSource.com (n.d.). Production Leveling: Extended Entry. Retrieved 19.11.2016 from http://www.businessknowledgesource.com/manufacturing/production_leveling_extended_entry_026155.html

Cardenas, E. (2014). Lean Strategy Deployment - Quick Overview. Retrieved 22.11.2016 from http://www.slideshare.net/EdgarICrdenas/lean-strategy-deployment-quick-overview

Carreira, B. (2004). *Lean Manufacturing That Works: Powerful Tools for Dramatically Reducing Waste and Maximizing Profits.* New York: Amacom.

Conant, D. (2012). Get your employees engaged. Retreived 21.11.2016 from https://www.youtube.com/watch?v=9buGE_vKxcc&index=12&list=PLTcEsigg0Fe9U9bTgw6XVGJcYThxLtvLP

Creative safety supply (n.d.). 5S Training and Research Page - CSS Research and Training Center. Retrieved 20.11.2016 from https://www.creativesafetysupply.com/content/education-research/5S/index.html

Davies, M. (2013) The 21st Century – The Principles of the Lean Business System: #8 Perfection. Retrieved 20.11.2016 from http://sapartners.com/tag/lean-business-modelsystem/

Davies, M. (2015) Use the Business model, its OK! Retrieved 20.11.2016 from http://sapartners.com/tag/lean-business-modelsystem/

Drucker, P. (2006). What Executives Should Remember. *Harvard Business Review*, 84 (2).

Eckes, G. (2001). *Making Six Sigma last*. New York: John Wiley and Sons.

Flinchbaugh, J. (2011) Going to the Gemba. Retrieved 18.11.2016 from http://www.industryweek.com/articles/going_to_the_gemba_25543.aspx

Gapp, R., Fisher, R., & Kobayashi, K. (2008) Implementing 5S within a Japanese Context: An Integrated Management System. *Management Decision* 46 (4), 565-579

Gerard, K. (2013). Improving Quality Control with the Deming Cycle. Retrieved 15.11.2016 from http://info.craftechind.com/blog/bid/251365/Improving-Quality-Control-with-the-Deming-Cycle

Great place to work institute. (n.d.) Millainen on hyvä työpaikka. Retrieved 26.11.2016 from http://www.greatplacetowork.fi/toimintatapamme/millainen-on-hyvae-tyoepaikka

Hakanen, J. (2009) Työn imua, tuottavuutta ja kukoistavia työpaikkoja – kohti laadukasta työelämää. Retreived 25.11.2016 from http://www.tsr.fi/tsarchive/files/Selvityksia/TSR_Tata_on_tutkittu2009.pdf.

Hines, P., Found, P., Griffiths, G., & Harrison, R. (2008) *Staying Lean: Thriving, Not Just Surviving.* Productivity Press, 2008

Hirano, H. (1996). *5S for Operators: 5 Pillars of the Visual Workplace*. New York: Productivity Press

Ho, S., Cicmil, S. & Fung C. (1995) The Japanese 5-S Practise and TQM training. *Training for quality* 3(4), 19-24.

Ho, S. & Cicmil, S. (1996). Japanese 5-S practise. *The TQM Magazine* 8(1), 45.

Imai, M. (1986). *Kaizen: The key to Japan's competitive success.* New York: McGraw-Hill

Imai, M. (1990). Kaizen Wave Circles the Globe. *Tokyo Business Today*. 58 (5), 44.

Juuti, P. (2006) *Organisaatiokäyttäytyminen.* Helsinki: Otava

Kaizen institute. (n.d.). What is Kaizen? Retrieved 15.11.2016 from https://www.kaizen.com/about-us/definition-of-kaizen.html

Koenigsaecker, G. (2013). *Leading the Lean Enterprise Transformation*. Boca Raton: CRC Press.

Kotter, J (1996). *Leading Change*. Harvard Business Review Press.

Kotter, J. (2011a). The heart of change. Retrieved 21.11.2016 from

https://www.youtube.com/watch?v=1NKti9MyAAw&index=4&list=PLTcEsigg0Fe9U9bTgw6XVGJcYThxLtvLP

Kotter, J. (2011b). Resistance to change. Retrieved 21.11.2016 from https://www.youtube.com/watch?v=Wdroj6F3VlQ

Kumar, R., Sudhahar, C., Dickson, J., Senthil, V. & Devadasan, S. (2007). Performance analysis of 5-S teams using quality circle financial accounting system. *The TQM Magazine.* 19 (5), 483-496.

Lanigan, J. (2004). 5S Provides Competitice Lean Foundation. *Surface Mount Technology* 18 (5), 70.

Lean Enterprise Institute (n.d.). Heijunka. Retrieved 18.11.2016 from http://www.lean.org/lexicon/heijunka

Lean Enterprise Research Center (n.d.). What is Lean Thinking? Retrieved 31.10.2016 from http://www.leanenterprise.org.uk/what-is-lean-thinking/what-is-lean-thinking-and-key-lean-thinking-principles.html

Liker, J. (2003). The Toyota Way. 14 Management Principles from the World's Greatest Manufacturer. McGraw-Hill Education

Locher, D. (2013). Practising Lean Fundamentals in an office environment. Retrieved 19.11.2016 from http://www.lean.org/common/display/?o=2215

Lämsä, A-M. & Hautala, T. (2004) *Organisaatiokäyttäytymisen perusteet.* Helsinki: Edita

Mann, D. (2015). *Creating a Lean Culture, Tools to sustain lean conversions*. Boca Raton: CRC Press

Markovitz, D. (2007). How to Make an Office Lean, Classic lean techniques worked wonders at a New York City government office. Retrieved 19.11.2016 from http://www.industryweek.com/companies-amp-executives/how-make-office-lean

Maslow, A. (1943) A Theory of Human Motivation. *Psychological Review*, 50(4), 370–396.

Metso (2015a). Laajennettu johtoryhmä 9.1.2015. Meeting material. (confidential).

Metso (2015b). Laajennettu johtoryhmä 13.2.2015. Meeting material. (confidential).

Metso (2015c). Laajennettu johtoryhmä 13.5.2015. Meeting material. (Confidential).

Myers, M. (2009) *Qualitative research in Business and management*. SAGE Publications Ltd.

Ojasalo, K., Moilanen, T. & Ritalahti, J. (2009) *Kehittämistyön menetelmät: Uudenlaista osaamista liiketoimintaan*. Helsinki: WSOYpro Oy.

Pojasek, R. (1999) Five 5s: A tool That Prepares an Organisation for Change. *Environmental Quality Management*, 9 (1), 97-103.

Ries, E. (2011). *The Lean Start Up.* Random House

Robbins, J. (2012) *Nine minutes on a Monday*. McGraw-Hill Education

Rother, M. (2010). *Toyota Kata: Managing People for Improvement, Adaptiveness and Superior Results*. New York: McGraw-Hill Companies

Rouse, M. (2013). Lean Management. Retrieved 30.10.2016 from http://searchcio.techtarget.com/definition/lean-management

Ryan, R. & Deci, E. (2000) Self-Determination Theory and the Facilitation of Intrinsic Motivation, Social Development, and Well-Being. *American Psychologist*, 55(1), 69.

Schipperheijn, K. & Verhasselt, C. (2014) Why Social Learning amplifies lean learning. Retrieved 18.11.2016 from https://habitofimprovement.wordpress.com/2014/07/14/why-social-learning-amplifies-lean-learning/

Senge, P. (1992) Building learning organizations. *The Journal for Quality and Participation.* 15 (2), 30.

Shingo, S.(1987) *The Sayings of Shigeo Shingo: Key Strategies for Plant Improvement*. Cambridge Mass: Productivity Press.

Torkkola, S. (2015) *Lean asiantuntijatyön johtamisessa.* Helsinki: Talentum.

Urbance (n.d.). ESD.83 Book Review by Randy Urbance The Machine that Changed the World by James Womack, Daniel Jones, and Daniel Roos. Retrieved 31.10.2016 from http://web.mit.edu/esd.83/www/notebook/machine.pdf

Van Patten, J., (2006). A Second Look at 5S. *Quality Progress* 39(10), 55-59.

Vonderhaar, F. & Lindquist, R. (n.d.) Managing to Standard Work in the Office. Retrieved 20.11.2016 from https://www.isixsigma.com/methodology/lean-methodology/managing-to-standard-work-in-the-office/

Withanachchi, N., Handa Y., Karandagoda K., Pathirage P., Tennakoon N. & Pullaperuma D. (2007) TQM emphasazing 5-S principles. *International Journal of Public Sector Management* 20 (3), 168-177.

Womack, J., Jones, D. and Roos, D. (1990) *The Machine that Changed the World: The Story of Lean Production – Toyota's Secret Weapon in the Global Car Wars That Is Now Revolutionizing World Industry.* Harper Perennial

Womack, J. & Jones, D. (1996) *Lean Thinking: Banish Waste and Create Wealth in Your Corporation*. New York: Simon & Schuster